2015

NO DROP

the status of water losses & water use efficiency in metropolitan municipalities

REPORT

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

no drop
CERTIFICATION
water use efficiency
REGULATION

Strategic Water Partners Network
SOUTH AFRICA

Foreword

Table of Contents

Page

ACRONYMS

DWS	Department of Water and Sanitation
IWA	International Water Association
KPA	Key performance area
KPI	Key performance indicator
MNF	Minimum night flow
NDP	National Development Plan (2011)
NWRS2	National Water Resource Strategy 2 (2013)
NDRR	No Drop Risk Rating
NDRR/$NDRR_{max}$	No Drop Risk Ratio
NRW	Non-revenue water
PAT	Progress assessment tool
SIV	System input volume
SLA	Service level agreement
WCWDM	Water conservation and water demand management
WSA	Water services authority
WSP	Water services provider
WTW	Water treatment works
WUE	Water use efficiency
WUL	Water use license

Executive summary

INTRODUCTION

Regulation of public utilities, and in particular of water supply services, carries significant economic and social importance as they are essential to the development and cohesion of society. The importance of this function is emphasized when following the international trend whereby new and specialised agencies are created to provide for the regulation of their water utilities. In South Africa, this function is undertaken by the Department of Water and Sanitation (DWS), who has introduced a robust water services regulation strategy for the water sector. The strategy clarifies the requirements and obligations placed on Water Services Institutions (WSI), thereby protecting consumers from a potentially unsustainable and unsafe service.

Regulation has the primary task to set and/or interpret rules, standards and, where relevant, grant approvals for the water sector. Regulation must monitor compliance, analyse and publish results, promote transparency and confidence in the actions of the Regulator. It must make determinations, enforce decisions and intervene where necessary. In addition, the Regulator creates an environment conducive to sustainable investment and operations of this capital-intensive sector.

The purpose of the 2013/2014 No Drop Metro Report is to provide an overview of the status of metropolitan municipalities as pertaining to their water security, water losses, non-revenue water and WUE, based on the 2013/2014 municipal financial year. The results are based on the findings of an extensive (full) No Drop assessment, coupled with a risk assessment, undertaken in the eight metropolitan municipalities of South Africa.

The No Drop strategy revolves around the identification of mediocre performing municipalities who consequently correct the identified shortcomings, as well as the introduction of competitiveness amongst municipalities and using benchmarking in the water industry.

Underlying the "Drop" philosophy, is the requirement for ***measurement*** and, more importantly, ***revealing performance*** with regard to the achievement of water use targets, water losses, non-revenue water and WUE, which Water Services Authorities (WSA) are obligated to comply with through legislation.

The No Drop system enables the Regulator to measure the performance of municipalities, and subsequently to reward (or penalises) the institution upon evidence of their excellence (or failures) according to the minimum standards or requirements that has been defined.

The ***No Drop Assessment*** is a comprehensive audit and gives an inclusive view of the Water Demand Management business of the WSI, based on the use of a wide range of Key Performance Areas (KPAs). It answers questions on planning, finance, technical skills, performance, etc. In the longer term, the ND assessment scorecards will become a high value source of data and information in specific areas, or in attaining a holistic view of the WSI's capacity, capability and performance in addressing WCWDM successfully.

The ***No Drop Risk Ratio*** (NDRR/$NDRR_{max}$) is a concise and focussed benchmark, using a Progress Assessment Tool (PAT) to extract some of the key risk areas that would individually and collectively, give a hard and fast snapshot view of the status of the WSI's WDM business. The PAT is "hard and fast" in terms of measuring a limited number of essential focus areas which would indicate if WDM successes are being achieved over time in the particular WSI, in a specific province or nationally. The PAT is an indicator of "progress or digress" which can be run efficiently and accurately, annually or at any given time, without having to go through a comprehensive assessment process.

OVERVIEW OF RESULTS

There are eight metros in South Africa with a combined annual demand of 2 158.8 million m^3/annum, serving a population of 21.5 million. Metros represent 40% of the South African population and 47% of the urban water consumption, and are the reason why the metro municipalities were selected for a full No Drop audit.

Summary of metro population and water demand

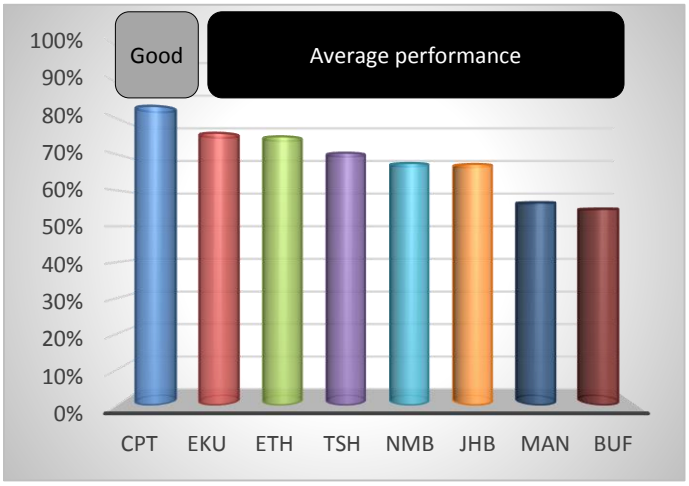
Province	Code	Metro name	Census 2011 Population	2013/14 No Drop Population	2013/14 SIV (m^3/annum)	Size (km^2)
EC	BUF	Buffalo City	755 200	741 387	65 469 165	2 536
WC	CPT	City of Cape Town	3 740 026	3 872 545	314 773 795	2 460
GT	EKU	Ekurhuleni	3 178 470	3 426 077	356 640 839	1 924
KZ	ETH	eThekwini	3 442 361	3 620 431	332 848 060	2 292
GT	JHB	City of Johannesburg	4 434 827	4 750 698	576 762 893	1 645
FS	MAN	Mangaung	747 431	778 423	86 571 263	6 284
EC	NMA	Nelson Mandela Bay	1 152 115	1 183 899	107 665 114	1 959
GT	TSH	City of Tshwane	2 921 488	3 173 684	318 052 305	6 345
Total			**20 371 918**	**21 547 144**	**2 158 783 434**	**25 445**
National			**51 770 563**	**53 697 292**	**4 598 000 000**	
% of National			**39%**	**40%**	**47%**	

The water resources in the metros have been investigated in detail in the past few years by the DWS and in each case, WCWDM has been identified as key intervention required to balance the available supply against the projected future requirements. These targets have been included in the National Water Resource Strategy 2 (NWRS2, 2013) and it is critical that metros achieve these targets. Metros are areas of economic significance and water restrictions could have a significant detrimental effect on the local economies and the country as a whole. An average and weighted average are provided for each key performance indicator. The weighted average is highly influenced by City of Johannesburg since they account for 27% of the total metro demand.

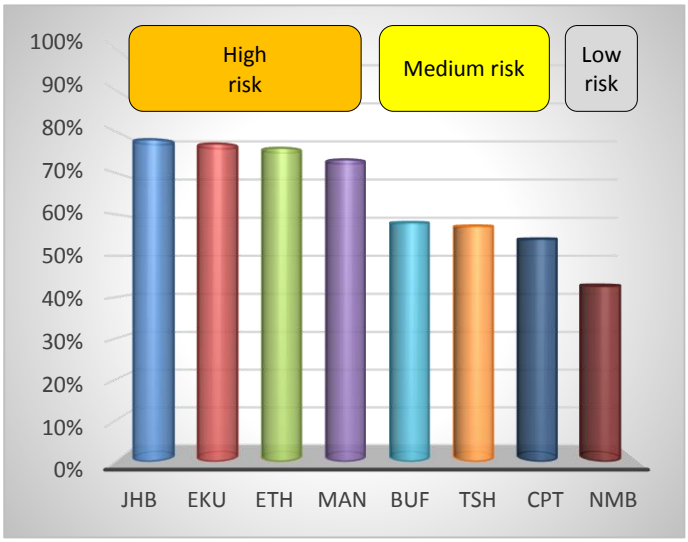
Overall No Drop score

City of Cape Town is the best performing metro, followed by Ekurhuleni, eThekwini and City of Tshwane, who all have above average scores. Nelson Mandela Bay, City of Johannesburg, Mangaung and Buffalo City all have scores below the average of 69%.

All metros are expected to perform better in the next audit as a result of improved evidence and understanding of the No Drop requirements.



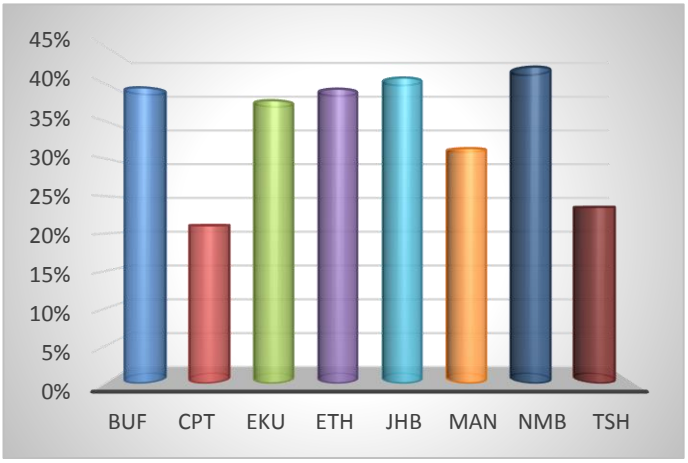
No Drop risk ratio (NDRR/NDRR$_{max}$)



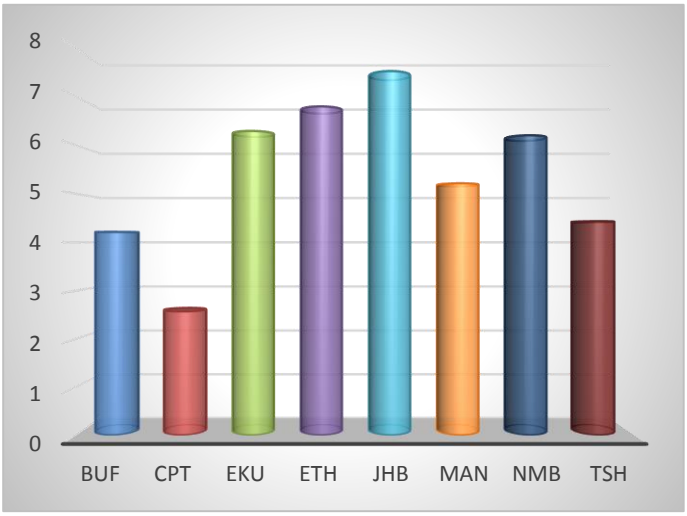
The average risk rating for all metros is 62.9% which places it in a medium risk category. Half of the metros are in the high-risk category and seven of the eight metros are nearing or exceeding their availability of supply. The risk rating is a function of the water availability, current usage, and water loss performance indicators.

The NDRR compares well with the overall No Drop score and highlights that metros need to address WUE as a matter of urgency to ensure water security.

NRW is the volume of water supplied by the water utility but for which it receives no income. It should be noted that all billed water is considered revenue water, irrespective whether it is paid for or not.

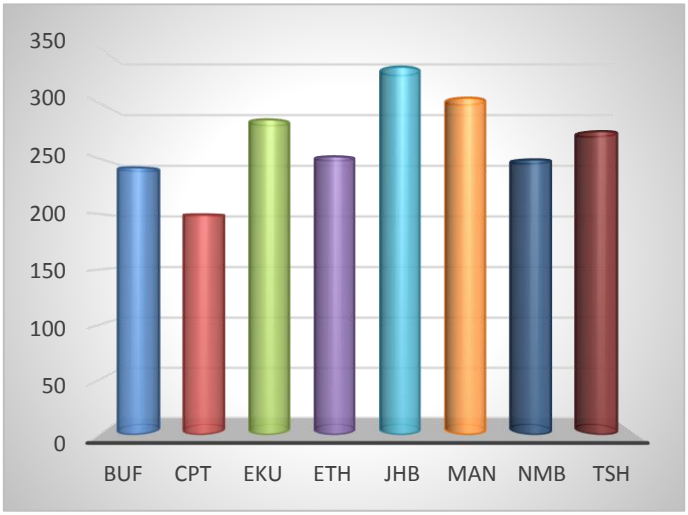


The total volume NRW is 923.5 million m^3/annum. Six metros (three quarters) have NRW in excess of 35%. The metro average NRW is 34.5% and the weighted average is 42.8%. The weighted average is highly influenced by City of Johannesburg. At an average purchasing cost of R 6.00 / kl, this represents a loss of almost R 5.5 billion per annum (R6.00 x 923.5 million m^3/annum).



The Infrastructure Leakage Index (ILI) is the preferred real water loss indicator of the IWA and used in the scorecard to assess real losses. The ILI provides an indication of the current physical losses versus the expected physical losses. For example, an ILI of 3 means that the current leakage in the system is 3 times the expected minimum leakage.

The average ILI for all metros is 5.4 while the weighted average is 5.5. City of Cape Town has the lowest ILI followed by Buffalo City and City of Tshwane.



Litres per capita per day provides an indication of the gross volume of water used per capita (person) per day. Although the calculation is based on the total system input volume (m^3/year) which includes industrial consumption, it does provide a useful indicator.

The average litres / capita / day is 267 and the weighted average 274. The weighted average is highly influenced by City of Johannesburg which is not only the largest consumer but also has the highest per capita consumption. The average consumption is above the international benchmark of 180 ℓ/c/d (WRC, 2012) and metros are encouraged to target an average consumption of below 200 ℓ/c/d.

CONCLUSIONS AND RECOMMENDATIONS

All metros have strategies and business plans to address the NRW, water losses and efficiency. Significant progress has been made with the implementation of these strategies and business plans, but there is still a lack of political support, budgets, alignment to the Department's reconciliation strategies and understanding of the possible consequences of water restriction. The targets set under the various reconciliation strategies are included in the NDP and NWRS2 and it is critical that these targets are achieved to avoid possible water restriction and the subsequent detrimental economic impact. All metros must revise their strategies and business plans to ensure targets are achieved and the risk of water restrictions is minimised.

Asset management has a direct impact on WCWDM. Without proper operation and maintenance it will not be possible to monitor the water losses in a distribution system and perform basic functions such as metering, billing and cost recovery. All metros could improve the operations and maintenance of their assets, which have a direct impact on water loss control.

No water services authority would be able to implement WCWDM without the necessary staff capacity and skills. Most WCWDM activities and preventative maintenance could be performed as part of the daily operation and maintenance of the system. Staff capacity and skills obtained the second lowest score of all the criteria and should be addressed as a matter of priority. A standard must be developed to specify the skills and capacity required to operate and maintain a water distribution system.

The information used to prepare a monthly water balance is in general credible, plausible and readily available. Proper management, reading and billing of consumer meters cannot happen if there is not a good relationship between the finance and technical departments. The finance and technical departments in all metros should interact on a daily basis to ensure consumer meters are properly installed, repaired, inspected, read and billed. All metros should strive to meter and bill, based on actual meter readings, to ensure the financial sustainability of the metro and customer satisfaction.

Key performance indicators and compliance with the water demand management regulations contributed most to the overall score. Metros should endeavour to fix all leaks within 48 hours of becoming aware thereof, improve water losses, NRW and efficiency and implement pressure management. Improved compliance and performance will significantly improve the overall score of all metros. The large number of unmetered connections and deemed consumers must be addressed as a matter of priority to promote water use efficiency and generate income for the metros. The results indicate that average system pressures are high and there is scope for aggressive pressure reduction in all metros. Pressure reduction is a cost effective WCWDM measure and should be implemented as a priority.

All metros have the necessary policies and bylaws but enforcement could be improved through political support and additional human resources. Metros will get the benefit through reduced water theft, consumer awareness and equality.

There is significant scope for increased community awareness in all metros. Consumers need to be made aware that South Africa is a water scarce country and the value of water should be appreciated. Community awareness programmes will improve the relationship between the metro and its customers, create more informed consumers and reduce the risk of service delivery unrest.

Metros could benefit from WCWDM programmes through improved service delivery, sustainable resources, financial viability, social and economic improvement. The key WCWDM interventions identified by the metros include pressure management, top consumer audits, household leak repair programmes, metering of unmetered properties and water reuse have been proven to provide a very good return on investment, with payback periods of less than 3 years.

Metros need approximately R 2 billion per annum to fund their WCWDM programmes and currently have a shortfall of R 500 million. A 10% reduction in SIV and reducing NRW to 25% can generate approximately R 2 billion additional income for metros through reduced water purchases and increased water sales. There is a business case for obtaining funding from financial institutions, as the estimated savings are equivalent to the average annual budget required for WCWDM.

1 INTRODUCTION

1.1 Background

Regulation of public utilities, and in particular of water supply services, carries significant economic and social importance as they are essential to the development and cohesion of society. The importance of this function is emphasized when following the international trend whereby new and specialised agencies are created to provide for the regulation of their water utilities. In South Africa, this function is undertaken by the Department of Water and Sanitation (DWS), who has introduced a robust water services regulation strategy for the water sector. The strategy clarifies the requirements and obligations placed on Water Services Institutions (WSI), thereby protecting consumers from a potentially unsustainable and unsafe service.

Regulation has the primary task to set and/or interpret rules, standards and, where relevant, grant approvals for the water sector. Regulation must monitor compliance, analyse and publish results, promote transparency and confidence in the actions of the Regulator. It must make determinations, enforce decisions and intervene where necessary. In addition, the Regulator creates an environment conducive to sustainable investment and operations of this capital-intensive sector.

In launching a regulatory strategy appropriate for the South African Water Sector, DWS has chosen a multi-facetted and programmatic approach, which enables the progressive implementation of regulation appropriate to the institutional capacity of the sector, while supporting the achievement of the local government developmental objectives.

One of the approaches is that of incentive-based regulation, which was introduced on 11 September 2008 to the water sector, at the National Municipal Indaba in Johannesburg, by the Minister of Water Affairs. The concept was defined by two programmes: the Blue Drop Certification Programme for drinking water quality management regulation; and the Green Drop Certification Programme for wastewater services regulation. Inspired by the successes of the approach, the Minister of Water Affairs subsequently introduced the No Drop Certification Programme for water use efficiency and water loss management on 21 May 2013 during her Budget Vote Speech.

The DWS remains cognisant of the need to strengthen its regulatory approach based upon the fundamentals of conventional regulation, to ensure that credibility is not compromised. Incentive-based regulation is a form of regulation and should not be perceived to be a weakened form of enforcement. The Blue Drop Certification, Green Drop Certification and No Drop Certification programmes are based upon the core fundamentals of regulatory responsibilities and are therefore not regarded as a Municipal Support Programme. The results attained from the Drop audits are however, a credible and valuable source of information to identify areas which should be focussed on and trigger sector-wide support programmes, since it provide specific system and performance related gaps and priorities that need to be addressed.

In building on the cornerstones of incentive-based regulation, risk-based strategies have been developed to support the regulatory approach. No Drop assessments are therefore supported by a risk index or risk rating, which reflect the risk exposure of the sector or WSI in the sector.

The purpose of the 2013/2014 No Drop Metro Report is to provide an overview of the status of metropolitan municipalities as pertaining to their water security, water losses, non-revenue water and WUE, based on the 2013/2014 municipal financial year. The results are based on the findings of an extensive (full) No Drop assessment, coupled with a risk assessment, undertaken in the eight metropolitan municipalities of South Africa.

1.2 The Four Pillars

The National Water Act (Act 36 of 1998) recognises the pivotal role that WCWDM plays in water resource management with the objective of reconciling water supply and demand. The No Drop recognises and work towards strengthening the pillars of effective, efficient and sustainable WCWDM.

Water conservation – the minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water

Water demand management – the adaptation and implementation of a strategy or a programme by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability.

The four pillars of WCWDM

1.3 No Drop philosophy

The No Drop strategy revolves around the identification of mediocre performing municipalities who consequently correct the identified shortcomings, as well as the introduction of competitiveness amongst municipalities and using benchmarking in the water industry.

Underlying the "Drop" philosophy, is the requirement for ***measurement*** and, more importantly, ***revealing performance*** with regard to the achievement of water use targets, water losses, non-revenue water and WUE, which Water Services Authorities (WSA) are obligated to comply with through legislation.

The No Drop system enables the Regulator to measure the performance of municipalities, and subsequently to reward (or penalises) the institution upon evidence of their excellence (or failures) according to the minimum standards or requirements that has been defined.

To achieve this, the DWS defines and communicates a basis for measuring performance across the key areas pertaining to water use efficiency as managed by municipalities and regulated by the Department. The Department is using a WUE scorecard to as tool to identify and assess the core

competencies (criteria) that enable acceptable performance in water demand management in the municipal sector. It also generates feedback for participating municipalities to define risk profiles and inform turnaround plans. It further generates baseline data that can accurately provide the quantum of losses, metering and billing proficiencies, which in turn can be used to identify municipal areas in need of targeted support, as well as elevating priority regions where collective intervention actions are required.

1.4 The Water Use Efficiency Assessment & Evaluation System

The ***No Drop Assessment*** is a comprehensive audit and gives an inclusive view of the Water Demand Management business of the WSI, based on the use of a wide range of Key Performance Areas (KPAs). It answers questions on planning, finance, technical skills, performance, etc. In the longer term, the ND assessment scorecards will become a high value source of data and information in specific areas, or in attaining a holistic view of the WSI's capacity, capability and performance in addressing WCWDM successfully.

The No Drop assessment and evaluation process has been designed to provide **focus points,** and to **channel effort and energy to build competencies** and positively impact on current performance pertaining to WUE.

For this reason, the No Drop Certification scorecard seeks to select the key areas (institutional, social, technical, economical and legal proficiency) required for the sector that, if strengthened, will help improve the current level of water losses and non-revenue water in the municipal sector in South Africa. In addition, No Drop endeavours to:

- Develop an incentive based regulatory environment to improve service delivery and water security and reduce water losses and non-revenue water;
- Provide a guideline to water services institutions to reduce water losses, non-revenue water and improve efficiency;
- Incorporate the full water services cycle of the WSI by targeting political and management levels, finance and technical departments and customers;
- Reduce duplication; and
- Align and complement the Blue Drop, Green Drop and RPMS, as shown in the table below.

blue drop CERTIFICATION drinking water quality REGULATION		no drop CERTIFICATION water use efficiency REGULATION		green drop CERTIFICATION waste water service REGULATION	
1	WSP	1	Strategy, planning & implementation	1	W_2RAP
2	Asset management	2	Asset management	2	Asset management
3	Technical skills	3	Technical skills	3	Technical skills
4	Credibility and accountability	4	Credibility and accountability	4	Credibility and accountability
5	Compliance	5	Compliance & Performance	5	Compliance
		6	Local regulation	6	Local regulation
		7	Customer care		

WSAs are required to comply with 90% of the weighted criteria in the biannual assessment to obtain No Drop certification. The weighted criteria are phased in over a period of 10 years to allow for the establishment of a performance baseline in year one, followed by a progressive step-change process with each new assessment year. The process becomes increasingly comprehensive and stringent with each assessment to facilitate an incremental and continuous improvement to water loss management practices.

This audit's weighting

Criteria	Description	2016 (%)	2018 (%)	2020 (%)	2022 (%)	2024 (%)
1	WCDM strategy and planning	30	20	20	20	20
2	Asset management	10	10	15	20	20
3	Technical skills	10	10	5	5	5
4	Credibility	15	15	10	10	10
5	Compliance and performance	35	35	35	30	30
6	Local regulation	0	0	5	5	5
7	Customer care	0	10	10	10	10
Bonus		(17%)	(17%)	(17%)	(17%)	(17%)
Qualifiers		none	none	(100%)	(100%)	(100%)
TOTAL		**100**	**100**	**100**	**100**	**100**

Metros are already at an advanced stage of implementing WCWDM and were therefore evaluated on all seven criteria or the 2020 evaluation criteria.

1.5 The No Drop Risk Ratio

The No Drop Assessment is a biannual assessment, to give water utilities sufficient time to identify focus points, and to channel effort and energy to build competencies and positively influence current performance pertaining to WUE. To measure the performance of water utilities between assessments, the No Drop Risk Ratio ($NDRR/NDRR_{max}$) was developed.

The ***No Drop Risk Rating*** (NDRR) is a concise and focussed benchmark, using a Progress Assessment Tool (PAT) to extract some of the key risk areas that would individually and collectively, give a hard and fast snapshot view of the status of the WSI's WDM business. The PAT is "hard and fast" in terms of measuring a limited number of essential focus areas which would indicate if WDM successes are being achieved over time in the particular WSI, in a specific province or nationally. The PAT is an indicator of "progress or digress" which can be run efficiently and accurately, annually or at any given time, without having to go through a comprehensive assessment process.

The Audit and the PAT are designed such that the PAT process will be able to mine data from the ND Audit Process in order to continue with a year-to-year benchmarking exercise without expending additional effort. Therefore, a close link will always remain between the Audit and the PAT.

The PAT consists of two elements:

- Collection of high level data
- Calculation of a NDRR

The key risk indicators selected for the calculation of the NDRR are selected based on their ability to describe the risk exposure of the sector or an individual role-player in the sector. The indicators therefore have to cover the following risk areas:

- ***Surety*** of water supply;
- ***Sustainability*** as measured in terms of total water use; and
- ***Performance*** as measured in terms of water use efficiency indicators.

The NDRR follows the same approach, and builds on the Blue Drop Risk Rating, Green Drop Cumulative Risk Rating, as per the following risk equations:

NO DROP	GREEN DROP	BLUE DROP
Equation: NDRR = A x B + D	**Equation: CRR = A x B + C + D**	**Equation: BDRR = A + C + D**
Where the indices represent: A : Water Use Targets (Recon and All-Town Strategy Targets) B : System Input Volume (SIV) D : Performance indicators (ILI + Commercial water losses + NRW + Efficiency)	Where the indices represent: A : Design capacity of the WWTW B : Operational flow of the WWTW C : Technical skill of the supervisor, process controllers and maintenance team D : Effluent quality performance	Where the indices represent: A : Treatment capacity of the WTP C : Technical skill of the supervisor, process controllers and maintenance team D : Water quality performance
All risk elements (A, B, C, D) are weighted according to their respective risk representation.		

The Blue Drop and Green Drop risk ratings include a component on the technical skills required of the supervisor, process controllers and maintenance team. The No Drop PAT includes a human resource risk rating, which is used by the Department for information purposes and the establishment of benchmarks, but is not included in the overall No Drop risk rating. Current there is no standard that specifies the human resource capacity and skills required to operate and maintain a water distribution network. This is shortcoming of the industry and often results in the appointment of inexperienced and under qualified staff to operate and maintain water distribution networks.

The NDRR weighting factors are as follows:

Category/Descriptions	Weighting factors
A - Water Usage Targets (million kl/annum)	
≥110	8
≥55 to <110	7
≥30 to <55	6
≥15 to <30	5
≥8 to <15	4
≥4 to <8	3
≥2 to <4	2
<2	1

Category/Descriptions	Weighting factors
B - SIV deviation from Water Usage Target (%)	
≥150%	5
≤100 to <150%	4
≤80 to <100%	3
≤50 to <80%	2
0 to <50%	1

Category/Descriptions	Weighting factors

Category/Descriptions	Weighting factors

D – WDM and WUE Performance Indicators $D = D_1 + D_2 + D_3 + D_4$	
D_1 - ILI	
ILI ≥ 8	2
6 ≤ ILI < 8	1.5
4 ≤ ILI < 6	1
2 ≤ ILI < 4	0.5
ILI < 2	0
D_2 - Commercial Water Loss	
> 40%	2
≥ 30% to < 40%	1.5
≥20% to < 30%	1
≥10% to < 20%	0.5
< 10%	0

D – WDM and WUE Performance Indicators $D = D_1 + D_2 + D_3 + D_4$	
D_3 - Non-Revenue Water	
≥ 40%	2
≥30% to < 40%	1.5
≥20% to < 30%	1
≥10% to < 20%	0.5
< 10%	0
D_4 - Water Use Efficiency	
≥300 l/c/d	2
≥ 250 l/c/d to < 300 l/c/d	1.5
≥ 200 l/c/d to < 250 l/c/d	1
≥ 150 l/c/d to < 200 l/c/d	0.5
< 150 l/c/d	0

1.6 The No Drop Scorecard

The No Drop scorecard applied for the assessment of water use efficiency in the eight metros, is shown in the table below. The scorecard strives towards excellence based on best practice, and does not prescribe a minimum requirement or mere compliance.

KPA	Requirement / sub-requirement	Weighting
Criteria 1 :	**WCDM Strategy, planning and implementation**	**20%**
1.1 Water resource balance diagram	Provide a detailed raw **water resource balance diagram** complete with **a)** current demand, **b)** available supply as per WUL or SLA, **c)** projected (5 year) demand estimates with and **d)** without implementing WDM. Note: A water balance must be provided per system if water is abstracted from more than one catchment.	10%
1.2 Water Balance	Provide MONTHLY and ANNUAL composite **IWA water balance diagrams and supporting documents** for the complete system as part of the water audit (as a component in the WSDP) as per Reg 509 of 2001 Clause 10 of the Water Supply Regulations. Balance diagram to specify as a minimum the main components of the IWA balance including Water Losses broken down into : **a)** System input volumes (potable water), **b)** Billed metered and unmetered usage **c)** Unbilled Authorized Consumption, **d)** Water losses broken down into Real and Apparent Losses, **e)** Free Basic Water, and **f)** Non Revenue Water and to be supported by a schematic or layout drawing showing bulk meters, zones and main infrastructure components.	25%
1.3 : WDM Strategy and business plan	**a)** Evidence must be provided of a Council approved (or signed by MM, Director or Executive Director or CFO, or included in the IDP) WDM strategy and business plan consisting of at least the following: • Background and Context • Situation Assessment including a Needs Statement • Key Issues and Challenges • Focus Areas of Intervention • List of Proposed Interventions • Set targets for demand, NRW, commercial and real losses.	**25%**

KPA	Requirement / sub-requirement	Weighting
	• Allocation of responsibilities to specific persons/positions in the organisation (not departments) • Investment plan (Budget) and Multi-year Implementation Timeline **b)** Provide details on the actions, investment plan, timelines and progress of water demand management activities undertaken. Reg 509 of 2001 Clause 10. Do the targets meet the Recon Strategy Targets or All Town Strategy Targets?	
1.4 Number of metered customers	Percentage of customers who are metered including those who have been supplied with a measuring control device as calculated from the data presented in the summary section:	10%
1.5 Percentage of metered connections billed	Number of customers billed against actual meter readings.	10%
1.6 Flat rate or deemed consumption billing rate	Households billed on a flat rate or on a deemed consumption method as a percentage of all households (not only metered households) in order to indicate percentage or rate of unconfirmed billing.	10%
1.7 Tariffs	Provide copy of all DOMESTIC water use tariffs **a)** for past three years **b)** indicating rising block tariff that would discourage high water use. Clause 10(2)d of the Water Services Act (Act no. 108 of 1997). Also in terms of Local Water Supply Bylaws.	10%
Criteria 1 Bonus (a): Multi-year water balances	Water balances for multiple years in line with Reg 509 of 2001 Clause 10	-
Criteria 1 Bonus (b): Household leak repair programme	Provide details of household leak repair programme for both indigent and non-indigent households including a) Households visited b) Methodology c) Policy d) Costs (audited) e) Proof of efficacy of the programme	-
Criteria 1 Penalty (a): WUL Regulatory compliance	Failing to provide evidence of water source availability through a valid Water Use Licence (or SLA with a WSP). The penalty will apply to a maximum of 50% of the total score achieved under Criteria 1.1	0%
Criteria 1 Penalty (b): Inclusion in the IDP	Components under Criteria 1.3 has not been included in the IDP or WSDP	0%

Criteria 2 :	Asset Management	15%
2.1 Asset register	The Institution must present a complete Asset Register. The asset register must : **a)** detail relevant equipment and infrastructure **b)** indicate asset description **c)** location **d)** condition (remaining life) **e)** replacement value The asset register must be supported by up-to-date network drawings inclusive of the entire supply and storage system.	15%
2.2 Mains replacement programme	Provide evidence of a pipe replacement plan with evidence of implementation as measured in terms of length of pipes installed in the previous financial years against the overall length of the entire primary and secondary distribution network.	15%

KPA	Requirement / sub-requirement	Weighting
2.3 Consumer meter maintenance and replacement programme	Provide details of compliance with Reg 509 of 2001 Clause 10(e) (Meter installation and testing details), including at least • number of new meters installed (as a % of total) • Meters replaced (as a % of total) • Meters tested and results (as a % of total) • Removal of unlawful connections (as a % of total) • Provide details of both proactive and reactive meter maintenance programme Evidence must be presented on responses to exception reports.	20%
2.4 Control valve and Bulk meter maintenance	**a)** Provide copy of control valve and bulk meter register and map indicating at least the • make, model and size, • GPS co-ordinates, • settings, • service schedule, • and performance monitoring along with **b)** an associated maintenance plan (cleaned, replaced, tested, etc.) with proof of implementation.	**20%**
2.5 : Monitoring and analysis of, and response to high water loss supply zones	Provide details in accordance with Reg 509 of 2001 Clause 11 on: **a)** active monitoring of ALL supply zones in terms of: • flow and pressure logging, • MNF analysis, • pressure analysis, • burst frequencies, • bulk meter readings, • use of SCADA systems and • pipe replacement. **b)** evaluation of data and **c)** response protocols and processes when anomalies are identified (excessive pipe leakages, reservoir overflows, illegal or unmetered connections, etc.) (works order will be accepted as evidence that the protocols have been implemented).	20%
2.6 O&M Budgets and Expenditure	The Institution must present credible evidence of: **a)** Maintenance Budget (as part of Operations Budget) **b)** Maintenance Expenditure (as part of the Operations Expenditure) **c)** Maintenance Expenditure should be **more than 5%** of the Operations Expenditure in total for the preceding Financial Year.	10%
Criteria 2 Bonus : Cathodic Protection	A bonus will be allocated if the WSA can provide evidence and maintenance records of a cathodic protection installed to protect its bulk mains. Evidence is to be presented in the form of a schedule of all bulk mains and the cathodic protection systems installed to protect each system. In addition to this monitoring results must be presented to the efficacy of each of the cathodic protection systems.	-
Criteria 2 Penalty : None	None	0%

Criteria 3 :	Technical skills	5%
3.1 Availability and competence of the water loss manager and team	a) The Institution must present evidence of a competent Water Loss Management Team indicating the WDM responsible persons (in form of a Organogram) with % vacant in accordance with Clause 66 (Staff matters) of the Municipal Systems Act 32 of 2000. b) Proof required on team manager competency (Qualification & Experience) with the following additional requirement: Manager to have suitable tertiary qualification with suitable experience. c) The Institution must present evidence of a competent structured Maintenance Team (in form of Organogram with well-defined positions and job descriptions; Contract or Invoice). Logbook with maintenance entries will serve as adequate evidence. d) Additional proof required on team competency for the team presented under (c) above (e.g. Qualification & Experience & Trade-test) e) Indicate number of qualified plumbers per 1000 connections. Alternative to a) and b) above:	40%

KPA	Requirement / sub-requirement	Weighting
	In WSAs where the WDM function is the responsibility of a number of different teams, the following must be provided: * Organograms of all key teams including Financial, Metering, GIS, IT, Reactive and Proactive Maintenance, Asset Management, Risk Management, WDM and others as relevant. Involvement of the sections must be proven. * Competency of the managers.	
3.2 Water loss meeting	**a)** Provide, for the period under review, minutes and reports of inter-departmental (tech & fin) **bi-monthly Physical water loss** and **Commercial loss** meetings as per Municipal Systems (Sec 9: Performance management) Act 32 of 2000. **b)** Provide evidence that the **outcomes** of the meetings are **actioned**.	**30%**
3.3 Training and capacity building	Provide, for the period under review, details of WCWDM training and capacity building programme for personnel, officials and politicians. Clause 68 (Capacity building) Municipal Systems Act 32 of 2000. **a)** Provide information on **course title, duration, accreditation status**. **b)** Provide evidence on **number of individuals (including officials and politicians)** attending the training.	15%
3.4 Meter readers	**a)** Provide details of: • qualification criteria, • compliance to the criteria, • training provided and • performance monitoring. to meter readers (both in-house and external). **b)** The WSI will provide evidence on: • the number of meter reader readers employed and • its meter reading strategy. Refer to the Municipal Finance Management Act (56/2003). in this regard.	**15%**
Criteria 3 Bonus : Demonstrated political support	Active involvement of executive council and councillors to promote WCWDM as evidenced by: **a)** their active promotion of efficiency, **b)** assisting with disconnections, **c)** assisting with credit control procedures, **d)** involvement in steering committees, and **e)** WUE performance is included in a measurement criteria of the performance assessment of the responsible MMC (Member of Mayoral Committee, MM, City Manager, CFO and Tech Director). **f) Other** (detail to be provided).	-
Criteria 3 Penalty : Performance Targets for Senior Officials	Progressive WUE targets aligned to the latest WDM strategy are included in the performance contracts of the following senior officials: MM, CFO and Technical Director. Non-conformance will attract the following penalties against Criteria 3.1, as per Sec 9: Performance Management of the Municipal Systems Act 32 of 2000.	0%

Criteria 4 :	Credibility	10%
4.1 Meter readings and billing system	Provide monthly reports indicating : **a)** readings, **b)** consumption (kl) per tariff code, **c)** summary report of monthly units sold, **d)** amount in Rands, **e)** number of journal entries and corrections as per the Chapter 9 (Credit control and debt collection) of the Municipal Systems Act 32 of 2000.	50%
4.2 Record keeping	For the preceding 3 year period, provide details on monthly meter readings, calculation sheets, comments on anomalies, etc. to comply with Reg 509 of 2001 Clause 11 (2)	20%

KPA	Requirement / sub-requirement	Weighting
	"Municipalities must keep record of the quantities of water measured and of the calculations made."	
4.3 Independent Audit	Provide evidence of independent investigations (outside of the normal metering and billing process) in order to confirm metering and billing information against a check of unmetered connections, meter accuracy, illegal connections, etc. (e.g. top consumer audits, random consumer audits and indigent consumer audits, etc.) to ensure that all users of the supply system are correctly billed. Investigation reports with recommendations and evidence of implementation of findings are to be presented for assessment.	20%
4.4 Flow meter verification	WSA is to present evidence on the flow meter verification or replacement practices employed on all meters excluding (bulk) consumer's meters. At least 30% of meters need to be evaluated per annum.	10%
Criteria 4 Bonus : None	None	-
Criteria 4 Penalty : Inaccurate meter readings	The penalty will be applied if an excessive number of corrections are reported under item 4.1 as considered over the full year of the assessment.	0%

Criteria 5 :	Compliance and Performance	35%
5.1 Repair of reticulation leaks	Provide details of leak repair schedule indicating a) date reported, b) date fixed, c) repair time, d) backlogs e) % repairs exceeding 48 hours to comply with Reg 509 of 2001 Clause 12 Target : All reticulation leaks must be repaired within 48 hours of becoming aware thereof.	15%
5.2 Physical water losses	Physical (real) water loss key performance in terms of the ILI as per Sec 6. (Performance Management) of the Municipal Systems Act 32 of 2000. • CARL = Current Annual Real Losses • UARL = Unavoidable Annual Real Losses ILI is calculated below.	20%
5.3 Commercial water losses	Commercial water loss key performance indicators as per Sec 6. (Performance Management) of the Municipal Systems Act 32 of 2000.	20%
5.4 Non-revenue water	Non-revenue water key performance indicators as per Sec 6. (Performance Management) of the Municipal Systems Act 32 of 2000. Note : Evidence must be provided that the consumption of informal settlements is included in the non-revenue water calculation.	15%
5.5 Water use efficiency	Water use efficiency key performance indicators as per Sec 6. (Performance Management) of the Municipal Systems Act 32 of 2000.	15%
5.6 Pressure Management	Provide copy of reticulation drawing along with records of pressure monitoring records indicating pressure distribution is not exceeding 900kPa (Reg 509 of 2001 Clause 15).	15%
Criteria 5 Bonus (a): Performance	A bonus will be awarded if the WSA is meeting the Recon/All Town targets. A partial target will be allocated if the WSA can show performance indicating a progressive path to meeting the Recon/All Town targets.	-
Criteria 5 Bonus (b): Additional	Bonus on aggressive pressure management	-

KPA	Requirement / sub-requirement	Weighting
pressure management		
Criteria 5 Penalty : Section 82	Penalty will apply should the Department find proof during / post assessment that the WSI is guilty of an offence as per Section 82 of the Water Services Act, by only submitting partial information (in any form) in order to present a false impression of WUE Performance and/or compliance. The penalty will apply to a maximum of 70% of the total score achieved under Criteria 5.	0%

Criteria 6 :	Local Regulation	5%
6.1 Metering, billing and credit control policy	Provide a copy of the municipal metering, billing and credit control policy. The score will be maximised if implementation can be demonstrated by way of evidence.	20%
6.2 Consumer meter replacement strategy	Provide evidence of a meter management programme addressing at least the following: • Age at which a meter is replaced, • Testing procedure to be followed for meters that are queried as being faulty by consumers, • Estimated number of meters that are to be replaced per annum with allocated budget, • Procedures followed in managing metering of large consumers, • Adoption and use of an electronic meter management database or system, and • Procedure followed in capturing meter information on the billing system.	15%
6.3 Bylaws	**a)** Provide copy of the latest (not older than 10 years) **promulgated** water supply bylaws highlighting clauses to: • promote water use efficiency such as removal of wasteful devices (automatic urinals), • Unlawful use of water, • Consumers responsibility to repair leaks and conserve water, • Use of Measuring Control Devices including Prepayment meters, and • Water restrictions in emergency situations **b)** Provide evidence of implementation of the bylaws (Compliance with Reg 509 of 2001 Clause 14.) NOTE: If the bylaws are older than 10 years, the bylaws may be accepted if proof can be provided that the bylaws have been communicated to customers in the last 5 years.	**30%**
6.4 Indigent database	Provide copy of latest indigent database and definition of indigent status.	30%
6.5 Consumer installations other than meters	The WSA must show commitment to the installation of quality fixtures to all households, particularly low cost housing schemes, by providing evidence that all fittings comply with the requirements below: 1) All plumbing components are to be JASWIC compliant (Joint Acceptance Scheme for Water Installation Components) and/or 2) Every consumer installation must comply with SABS 252: Water Supply and Drainage for Buildings and SABS 254: The Installation of Fixed Electric Storage Water Heating Systems. Provide copies of building inspection reports indicating compliance.	5%
Criteria 6 Bonus : War on Leaks	The removal of wasteful devices, such as automatic urinals, is actively pursued by the municipality in line with the requirements of Reg 509 of 2001 Clause 10(g). The evidence provided must include the following: **a)** Strategy **b)** Impact assessment of strategy and prioritisation in place **c)** Proof of implementation **d)** Proof of achievement of targeted goals.	-
Criteria 6 Penalty : None	None	0%

Criteria 7 :	Customer care	10%
7.1 : Customer Charter	**a)** Provide a copy of the municipal customer charter as approved by the Exec Director and the Portfolio Committee. The Charter should state: • the type,	**20%**

KPA	Requirement / sub-requirement	Weighting
	• nature and • timeframe within which a response can be expected from the municipality, by a customer, to queries and complaints (telephonic and written) regarding various service delivery failures and events **b)** The charter must specifically include: • Service level standards • The responsibilities of the municipality with respect to WUE • The responsibilities of the consumer with respect to WUE.	
7.2 Customer Care Centre	Provide copy of water related customer service report indicating at least: a) number of queries, b) number resolved, c) outstanding (monthly aging going back 6 months) d) type of queries. as per Chapter 6 (Performance Management) and Chapter 9 (Credit Control and Debt Collection) of the Municipal System Act 32 of 2000.	20%
7.3 Informative Billing	Provide copy of a typical monthly water bill showing **a)** at least last two meter readings with dates, **b)** consumption with measurement unit, **c)** whether the "readings" actual or estimated, **d)** 6 month historic usage trends for the specific consumer and **e)** highlighting of excessive usage against comparable consumer benchmarks as per Chapter 9. (Credit control and debt collection) of the Municipal System Act 32 of 2000.	20%
7.4 : Community awareness campaign	Provide, for the period under review, details of **on-going** **a)** public meetings, **b)** distribution of pamphlets and brochures, **c)** bill boards, **d)** local newspaper campaigns, articles and adverts, **e**) local radio campaigns, spots and talks, and **f)** door-to-door education to promote awareness on wastage, payment for services and leakage control (Reg R509 of 2001 Clause 3 & Municipal Systems Act 32 of 2000 Chapter 4).	20%
7.5 Schools awareness campaign	Description of programme implemented by the municipality that provides **on-going** information on water issues at all schools in its jurisdiction by providing: **a)** a scheduled consultative interaction and awareness generation at least 20% to 50% of schools in the municipal area, per annum, in order to attract a score. **b)** copies of materials used and distributed - **must include pamphlets or flyers to demonstrate commitment.**	20%
Criteria 7 Bonus (a): Sector awareness campaign and stakeholder forums	Provide details engagement activity schedule with **a)** industry, **b)** major consumers and **c)** institutions (Government, NGOs, etc.) to promote water use efficiency**.** Minutes of meetings will be accepted as evidence of the above.	-
Criteria 7 Bonus (b): Revenue enhancements	Innovative strategies employed to enhance revenue, for example incentives to pay, amnesty on illegal connections, meter reading by consumer, etc. WSAs are encouraged to report on their out-of-the-box ideas related to WUE improvements.	-
Criteria 7 Bonus (c): Innovative water supply	Innovative strategies and projects aimed at augmenting water supply volumes, at the required standard, through reuse, reclaim, recycle or other means of processed waters from alternative sources.	-
Criteria 7 Penalty : None	None	0%

1.7 Understanding the scorecard

Results from the KPAs and indicators are provided for each municipality in the following format.

2014 Municipal No Drop Score	54.92%

Key Performance Area	Weight	Water supply system
WCDM Strategy, planning and implementation	20%	70.0%
Asset Management	15%	80.0%
Technical skills	5%	31.5%
Credibility	10%	48.0%
Compliance and Performance	35%	58.8%
Local Regulation	5%	70.0%
Customer care	10%	46.0%
Bonus Scores		3.93%
Penalties (included in KPI score)		0.03%
No Drop Score (2014)		**54.92%**
Water Use Targets (Recon and All-Town Strategy Targets		0.00 million
Availability of supply based on current WUL or SLA		71.21 million
System Input Volume (kl/annum)		65.47 million
Infrastructure Leakage Index (ILI)		**4.2**
Apparent / Commercial Losses (% of SIV)		**7.6%**
Non-Revenue Water (%)		**39.5%**
Water Use Efficiency (l/cap/day)		**242**
NDRR		**36.5**
NDRR/$NDRR_{max}$		**76%**
Billed Authorised Use (l/cap/day)		146
Unbilled Authorised Use (l/cap/day)		4
Real Losses (l/cap/day)		74
% Water Losses		7.6%

The KPIs are colour-coded as follows:

Legend for No Drop Scores:

	90-100%	Excellent situation, need to maintain via continued improvement
	80-<90%	Good status, improve where gaps identified to shift to 'excellent'
	50-<80%	Average performance, ample room for improvement
	31-<50%	Very poor performance, need targeted intervention towards gradual sustainable improvement
	0-<31%	Critical state, need urgent intervention for all aspects of water use efficiency

ILI (Physical water loss) performance categories

	>8	Extremely high physical water loss
	6-8	Poor performance in physical water loss
	4-6	Average physical water loss performance
	2-4	Good physical water loss performance but some improvement may be possible subject to economic benefit
	<2	Excellent physical water loss management

Apparent / Commercial loss (%) performance categories

	>40%	Extremely high commercial water loss
	30-40%	Poor performance in commercial water loss
	20-30%	Average commercial water loss performance
	10-20%	Good commercial water loss performance but some improvement may be possible subject to economic benefit
	<10%	Excellent commercial water loss management

Non-Revenue Water (%) performance categories

	>40%	Extremely poor non-revenue water management
	30-40%	Poor non-revenue water performance
	20-30%	Average performance with potential for marked improvement
	10-20%	Good performance but some improvement may be possible subject to economic benefit
	<10%	Excellent non-revenue water management

Water Use Efficiency (l/cap/day) performance categories

	>300	Extremely high per capita water use
	250-300	Poor per capita water use
	200-250	Average per capita water use with potential for marked improvement
	150-200	Good per capita water use but some improvement may be possible subject to economic benefit
	<150	Excellent per capita water use management

No Drop Risk Ratio categories

NDRR =NDRR/$NDRR_{max}$	90% - 100% Critical Risk WSI	
	70% - <90% High Risk WSI	
	50% - to 70% Medium Risk WSI	
	<50% Low Risk WSI	

2 OVERVIEW OF RESULTS

2.1 Introduction

There are eight metros in South Africa with a combined annual demand of 2 158.8 million m^3/annum, serving a population of 21.5 million. Metros represent 40% of the South African population and 47% of the urban water consumption, and are the reason why the metro municipalities were selected for a full No Drop audit. The water resources in the metros have been investigated in detail in the past few years by the DWS and in each case, WCWDM has been identified as key intervention required to balance the available supply against the projected future requirements. These targets have been included in the National Water Resource Strategy 2 (NWRS2, 2013) and it is critical that metros achieve these targets. Metros are areas of economic significance and water restrictions will have a significant detrimental effect on the local economies and the country as a whole.

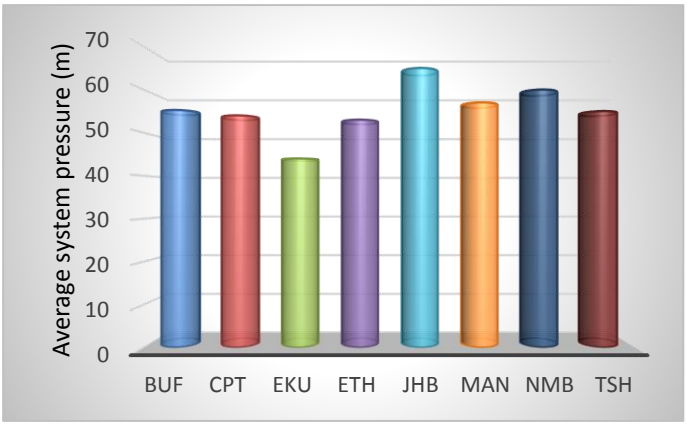
The population and SIV for the eight metros are summarised below.

Summary of metro population and water demand

Province	Code	Metro name	Census 2011 Population	2013/14 No Drop Population	2013/14 SIV (m^3/annum)	Size (km^2)
EC	BUF	Buffalo City	755 200	741 387	65 469 165	2 536
WC	CPT	City of Cape Town	3 740 026	3 872 545	314 773 795	2 460
GT	EKU	Ekurhuleni	3 178 470	3 426 077	356 640 839	1 924
KZ	ETH	eThekwini	3 442 361	3 620 431	332 848 060	2 292
GT	JHB	City of Johannesburg	4 434 827	4 750 698	576 762 893	1 645
FS	MAN	Mangaung	747 431	778 423	86 571 263	6 284
EC	NMA	Nelson Mandela Bay	1 152 115	1 183 899	107 665 114	1 959
GT	TSH	City of Tshwane	2 921 488	3 173 684	318 052 305	6 345
Total			**20 371 918**	**21 547 144**	**2 158 783 434**	**25 445**
National			**51 770 563**	**53 697 292**	**4 598 000 000**	
% of National			**39%**	**40%**	**47%**	

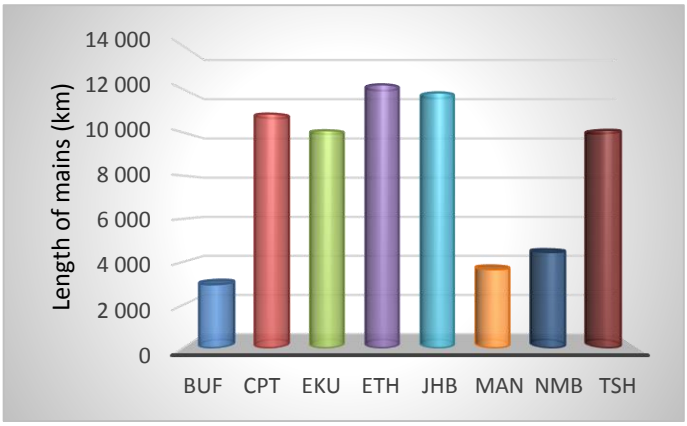
Each metro has its own challenges, which must be understood when comparing results. Johannesburg is by far the largest metro in terms of population and water use, while City of Tshwane and Mangaung covers the largest areas. eThekwini and Buffalo City have large peri-urban areas where metering and billing is often very difficult, if not impossible. All metros have large township areas and growing informal settlements, which tend to pose the biggest challenges. For purposes of this report, the metros were sorted in alphabetical order based on the municipal code.

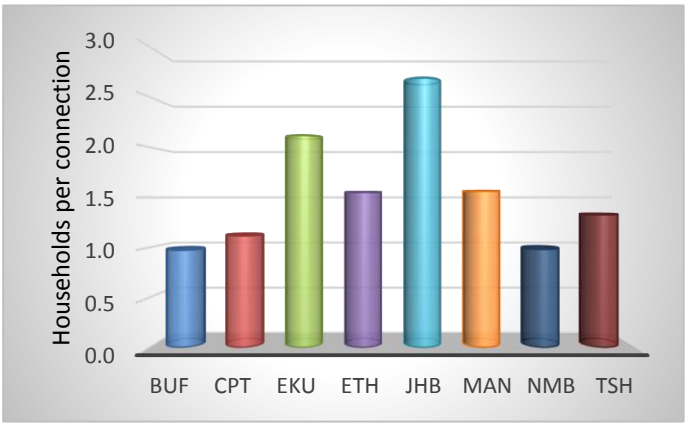
Accurate information on the average system pressure, length of mains, households per connection and number of connections is required as this has a direct impact on the calculation of KPIs. KPIs must be accurate, as they reflect the status quo of municipalities, highlights areas which needs improvement and provide benchmarks.



The average system operating pressure is based on pressure readings or the municipality's hydraulic model (if available). City of Johannesburg has the highest average system pressure followed by Nelson Mandela Bay. Ekurhuleni has the lowest average system pressure. The average system pressure for the eight metros is 55m, indicating there is considerable scope for further pressure reduction.

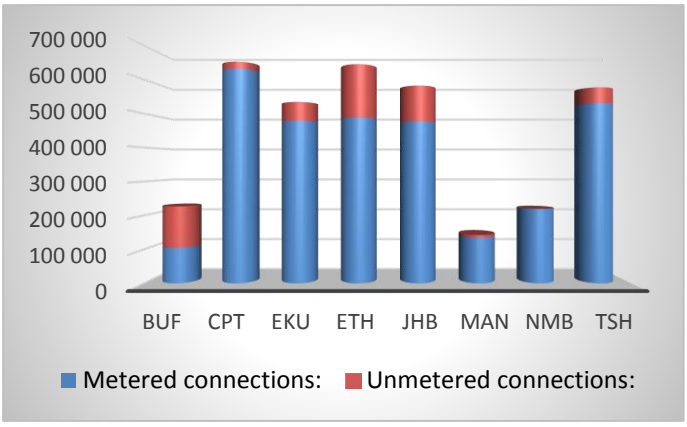
The length of water supply mains include transmission and distribution mains as obtained from the municipality's asset register. City of Cape Town, Ekurhuleni, eThekwini, City of Johannesburg and City of Tshwane all have between 10 000 and 12 500 km of water supply mains. Buffalo City, Mangaung and Nelson Mandela Bay have between 3 000 and 4 500 km of supply mains. The eight metros have a total of 66 210 km water supply mains.





On average, there are 1.6 households per connection in the metros. The number of households per connection is the highest in Ekurhuleni and the City of Johannesburg due to the high number of townhouse developments and backyard dwellers in these metros. In all the other metros, it is between 0.9 and 1.6 households per connection.

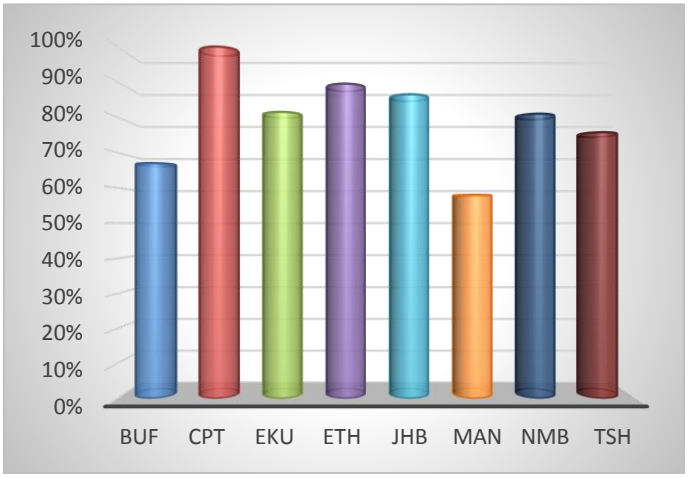
The five largest metros all have approximately 600 000 connections. eThekwini has the highest number of unmetered connections followed by Buffalo City. The eight metros supply 5 854 604 households through 3 578 791 connections. There are 514 995 unmetered connections in the metros of which 160 711 are billed on a flat rate or deemed consumption basis.



2.2 Key Performance Areas

2.2.1 Criteria 1: WCWDM Strategy, planning and implementation

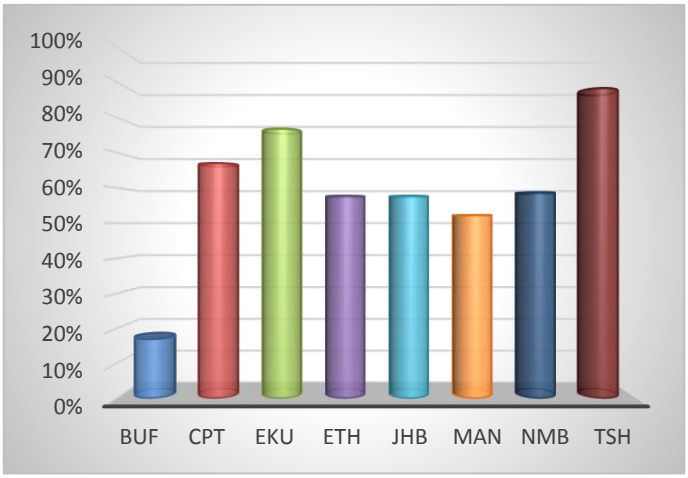
Criteria 1 measures the state of water consumption and security, water losses and NRW in the WSI, review the strategies and business plans to reduce the SIV, water losses and NRW and evaluate the progress made with the implementation of these strategies and business plans.



The average score for Criteria 1 is 79.9% and contributes 20% to the overall score. City of Cape Town is commended for being the only metro to obtain a full score. They have adopted and achieved the targets set under the Western Cape Reconciliation Strategy. The other metros lost points for not adopting and/or achieving their targets set under the various reconciliation strategies. Further discussions with the Department are also required to clarify base years, targets with and without WCWDM and the measurement of savings. Most metros were also penalised for not being able to present their water use license (WUL) or service level agreement (SLA). City of Tshwane did achieve their reconciliation target but were penalised since Rand Water is exceeding their licenced abstraction and there is no supply limit in their SLA with Rand Water. All metros should review their strategies and business plans to ensure they are aligned with their latest reconciliation strategy.

2.2.2 Criteria 2: Asset Management

Criteria 2 assesses if the water services infrastructure that has a direct impact on water losses and non-revenue water, is operated and maintained in an efficient, affordable, equitable, economical and sustainable manner.



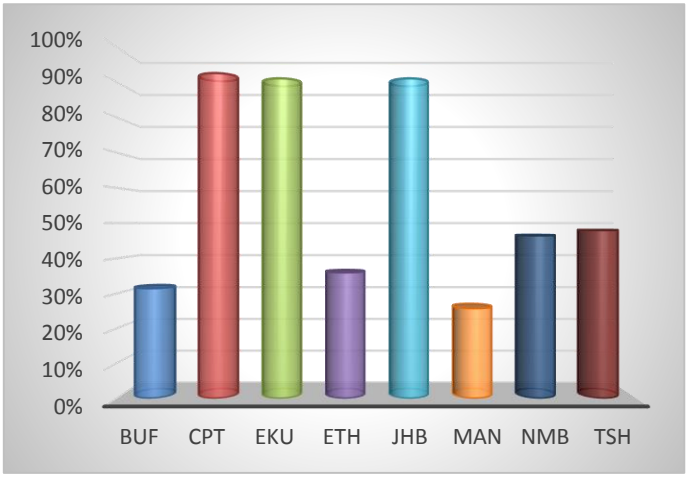
The average score for criteria 2 is 59.4% and contributes 15% to the overall score. Most metros do not have a dedicated operation and maintenance programme of their bulk water meters and control valves. Bulk meters, control valves and distribution networks are operated and maintained reactively and the information is not used to assess the performance of and leakage in supply zones. No metro was able to achieve a bonus point for cathodic protection. Buffalo City should urgently start an asset management programme while the other metros should improve their existing systems. City of Tshwane is

commended for their asset management programme, which is actively used to monitor the leakages in their water distribution zones.

2.2.3 Criteria 3: Technical skills

Criteria 3 measures the capacity and skills of the organisation to implement WCWDM, who is responsible for WCWDM and if this responsibility is included in the performance agreements of executive staff members. It further reviews if water demand management is promoted and implemented in a co-ordinated manner within the organisation.

Capacity and skills are a major problem in five of the eight metros with the average score 57.8% and contributing 5% to the overall score. The skills shortage is mainly at middle management and plumber team level. Capacity and skills shortages impact directly on the metro's ability to respond to leaks and perform preventative maintenance. WCWDM is also not included in many of the performance agreements of executive staff members.

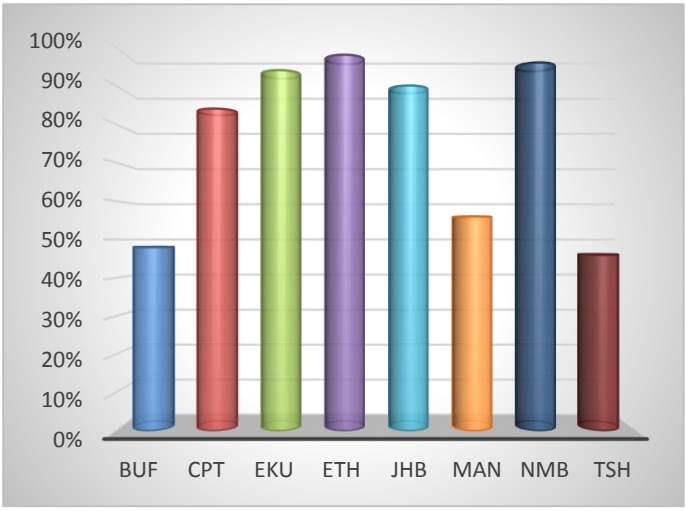


It is has been shown all over the world that water losses and leakages are low in well managed water supply system. The lack of management skills and capacity will not only impact on water losses, NRW and efficiency but also on the general operation and maintenance. Metros should urgently address their management, staff and skills shortages to ensure efficient and effective service delivery with subsequent low water losses and NRW.

2.2.4 Criteria 4: Credibility

Criteria 4 measures the credibility of the water balance data to ensure it is based on actual meter readings.

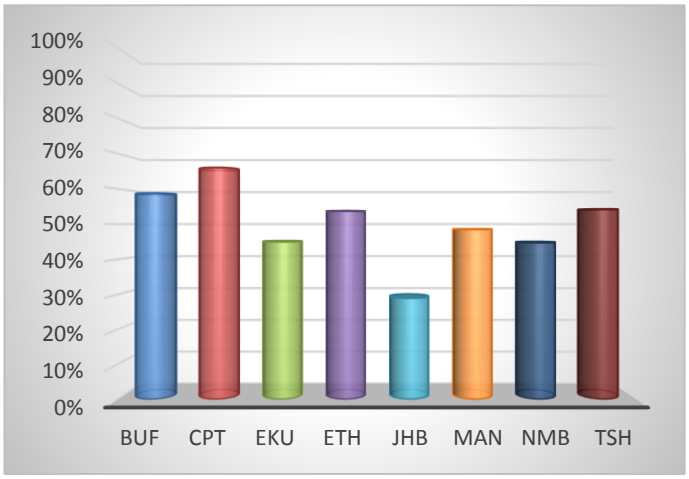
Most metros performed very well on Criteria 4, except for Buffalo City and Mangaung who need to improve the quality of their data to improve their score. City of Tshwane was heavily penalised since they were unable to provide evidence to prove their meter accuracy although this information seems readily available. It is recommended that City of Tshwane's finance department takes a more active role in the No Drop audit and provide the information as requested.



The average score for criteria 4 is 76.5% and contributes 10% to the overall score. Metros must prepare and verify their water balance on a continuous basis to ensure data is credible and consistent.

2.2.5 Criteria 5: Compliance and Performance

Criteria 5 measures the performance of the water services utility against international best practice benchmarks and the water demand management regulations. Scoring is more focussed on knowing and improving status than the actual value.

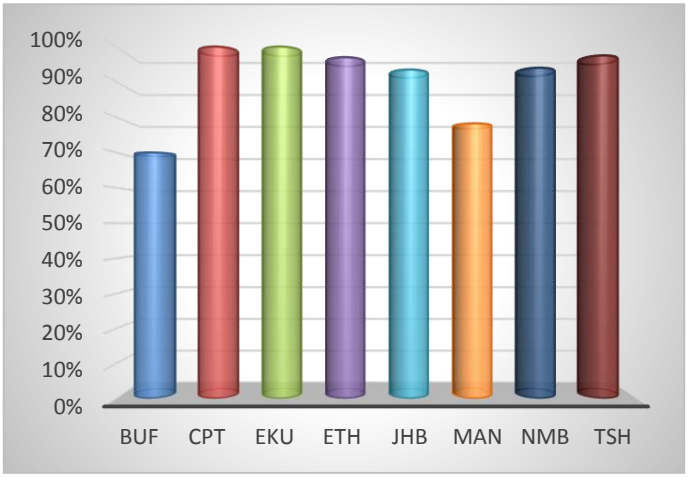


All metros were penalised for benchmarks that are above international best practice. City of Cape Town is the best performing metro with regards to NRW, water losses and efficiency but lost points for not improving their score from the previous year. No metro was able to score bonus points for aggressive pressure management. The average for criteria 5 is 50% and contributes 35% to the overall score. Improved KPIs and compliance with the water demand management regulations will significantly improve the overall score of all metros.

Concerns were raised that metros do not calculate their International Water Association (IWA) water balance in the same way and that this will impact on the individual scores. The inspectors and moderators were very conscious of this fact and used the audit to obtain a clear understanding of how metros prepare their water balance. The Department is now in a position to publish a guideline on the standardisation of the IWA water balance calculation which will have an impact on the KPIs of some metros.

2.2.6 Criteria 6: Local Regulation

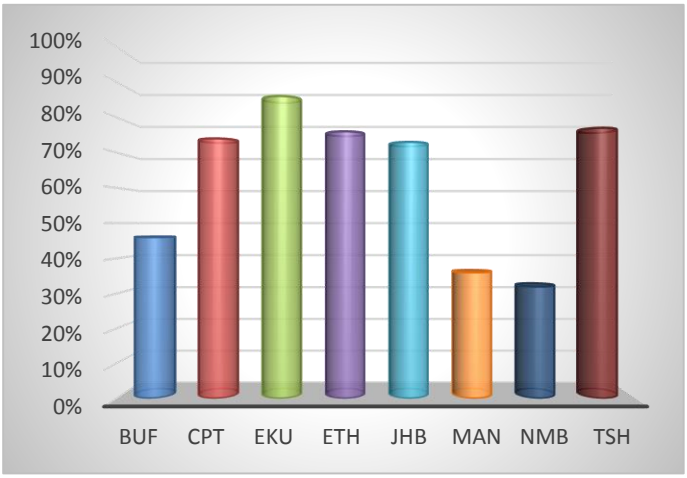
Criteria 6 measures the development and enforcement of policies and bylaws with specific reference to consumer meter replacement, indigents, and commitment to install quality fixtures to all households, particularly low cost housing schemes.



The average score for criteria 6 is 91.3% and contributes 5% to the overall score. All metros scored well with the exception of a few metros that have bylaws that do not promote WCWDM, unapproved or not enforced.

All metros are encouraged to review and enforce their policies and bylaws to ensure they promote WCWDM. Most metros have a good relationship with their housing department and play an active role in the installation of quality fixtures. Housing should form part of the internal WCWDM meetings to avoid the installation of substandard fittings.

2.2.7 Criteria 7: Customer Care



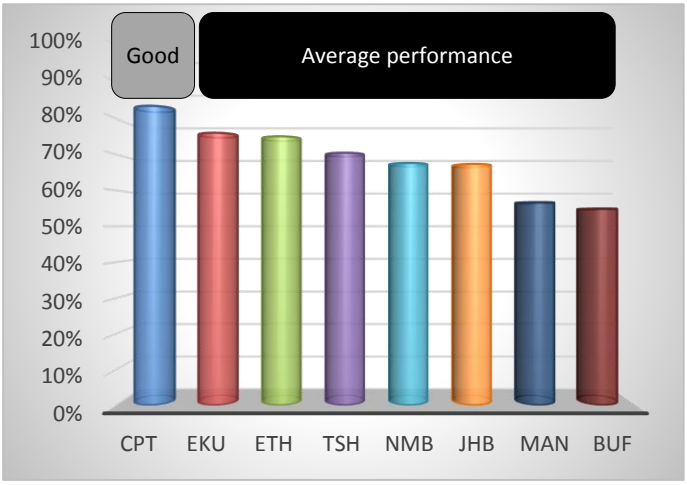
Criteria 7 measure the community awareness, outreach activities and innovative ideas to encourage water conservation and efficiency.

The average for criteria 7 is 62.5% and contributes 10% to the overall score. The large metros all have the staff capacity and budgets to undertake active awareness campaigns. The smaller metros generally lack budget and staff capacity to implement awareness campaigns.

2.2.8 Overall No Drop Score

None of the metros achieved No Drop certification status (score >90%). City of Cape Town is the best performing metro, followed by Ekurhuleni, eThekwini and City of Tshwane, who all have above average scores. Nelson Mandela Bay, City of Johannesburg, Mangaung and Buffalo City all have scores below the average of 69%.

Mangaung has various WCWDM programmes, budgets and the capacity but have been unable to show results or evidence. The metro is already in the process of addressing several of the issues raised during the audit and a significantly improved score is expected in the next audit.



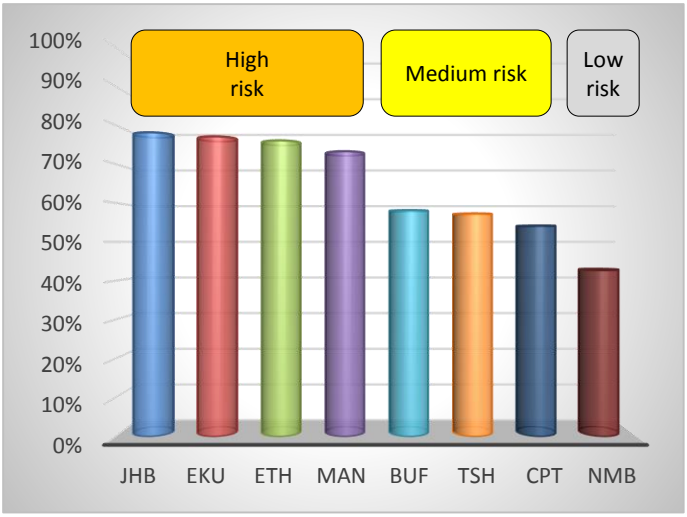
Buffalo City has staff capacity and budget problems but is already in the process of establishing systems that will improve the management of their NRW and water losses.

All metros are expected to perform better in the next audit because of improved evidence and understanding of the No Drop requirements.

The No Drop assessment was developed for all water utilities in South Africa and measures several key performance areas on a weighted criteria, to allow both metros and rural municipalities to perform reasonably well despite having high water losses, NRW or poor efficiency. This approach is necessary to ensure that poorly performing water utilities do not become despondent and abandon the

programme but can also not achieve No Drop certification status until they have addressed their WUE. This approach is clearly illustrated by eThekwini and Ekurhuleni, with both receiving scores above 75% despite both having NRW above 37%. In order to achieve No Drop certification status they will have to reduce their NRW, water losses and efficiency to internationally accepted standards.

2.2.9 Overall No Drop Risk Ratio (NDRR)



The average risk rating for all metros is 62.9% which places it in a medium risk category. Half of the metros are in the high-risk category and seven of the eight metros are nearing or exceeding their availability of supply. The risk rating is a function of the water availability, current usage, and water loss performance indicators.

The NDRR compares well with the overall No Drop score and highlights that metros need to address WUE as a matter of urgency to ensure water security.

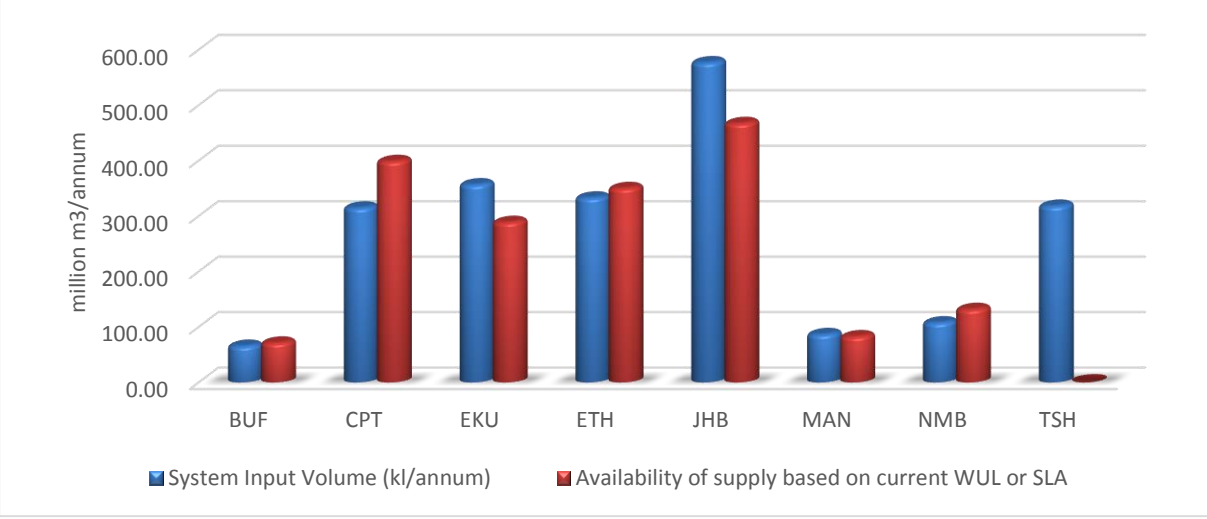
2.3 Key performance indicators

The IWA water balance, as shown, provides a breakdown of the system input volume (SIV), authorised consumption, NRW, apparent and physical losses. Once the water balance has been calculated, various key performance indicators (KPIs) can be calculated to measure the performance of the water supply system. With the water balance and KPIs available, the water utility can determine which components must be targeted first to improve efficiency, reduce commercial losses, physical losses or NRW. Once the main water loss contributing components have been identified and quantified, it will enable the metro to identify the most effective WCWDM interventions.

<table>
<tr><td rowspan="7">System Input Volume</td><td rowspan="3">Authorised Consumption</td><td rowspan="2">Billed Authorised Consumption</td><td>Billed Metered Consumption</td><td>Free basic Revenue Water</td></tr>
<tr><td>Billed Unmetered Consumption</td></tr>
<tr><td rowspan="2">Unbilled Authorised Consumption</td><td>Unbilled Metered Consumption</td><td rowspan="6">Non Revenue Water</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="4">Water Losses</td><td rowspan="2">Apparent Losses</td><td>Unauthorised Consumption</td></tr>
<tr><td>Customer Meter Inaccuracies</td></tr>
<tr><td rowspan="3">Real Losses</td><td>Leakage on Transmission and Distribution Mains</td></tr>
<tr><td>Leakage and Overflows at Storage Tanks</td></tr>
<tr><td>Leakage on Service Connections up to point of Customer Meter</td></tr>
</table>

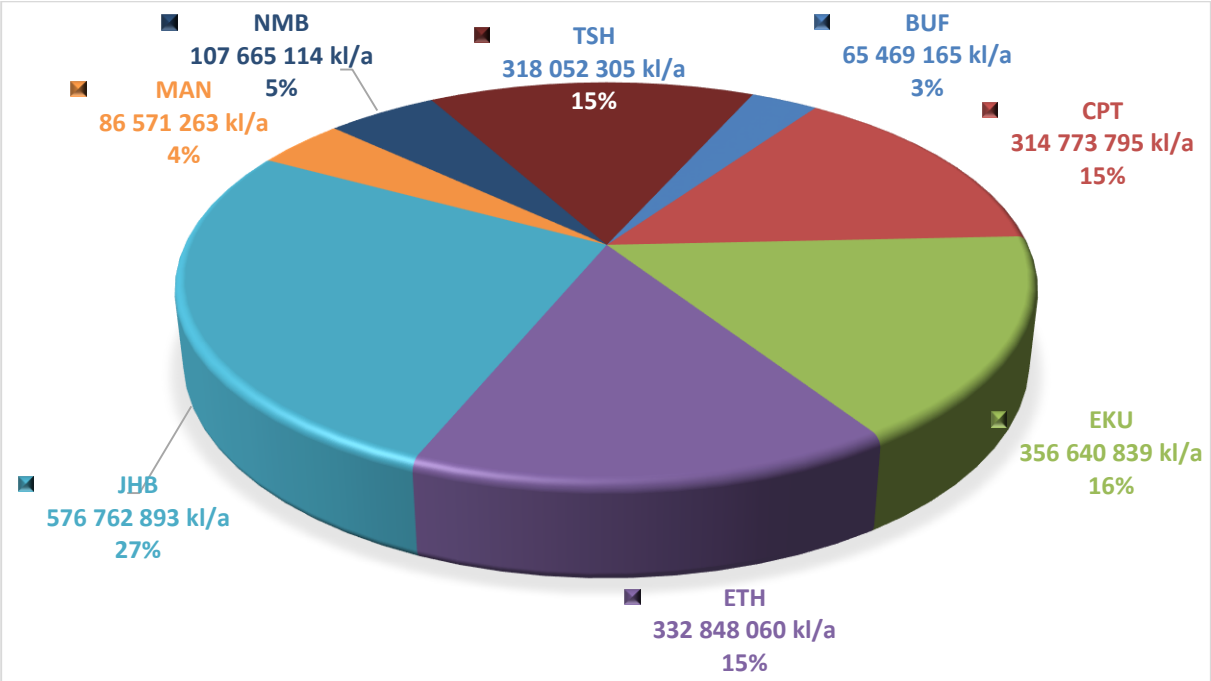
2.3.1 System input volume versus availability of supply

The system input volume represents the potable volume input to the water supply system from the water utility's own sources, as measured at the water treatment works (WTW) outlet, as well as any water imported from other sources.

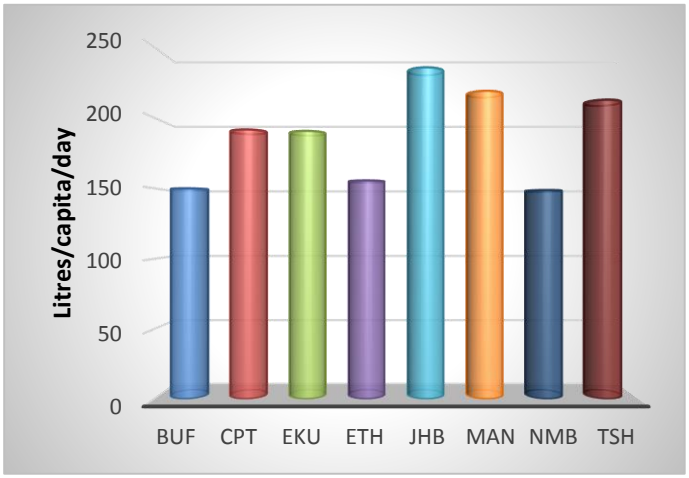


City of Johannesburg accounts for 27 % of the total metro consumption and is the largest urban water user in South Africa, followed by Ekurhuleni with 16 % which has the largest concentration of wet industries in South Africa. The water consumption for Buffalo City, Mangaung and Nelson Mandela Bay is significantly less than that of the other five metros. City of Tshwane did not provide evidence for assessment of their availability of supply, based on their current WUL or SLA. The combined metro SIV of 2 158.78 million m^3/annum is 2.4% above the available supply of 2 108.44 million m^3/annum

(assuming City of Tshwane's SIV = available supply). This highlights the importance of WCWDM, especially in the Vaal River system where the metro demand exceeds the available supply by 8.1%.



2.3.2 Authorised consumption (l/c/d)



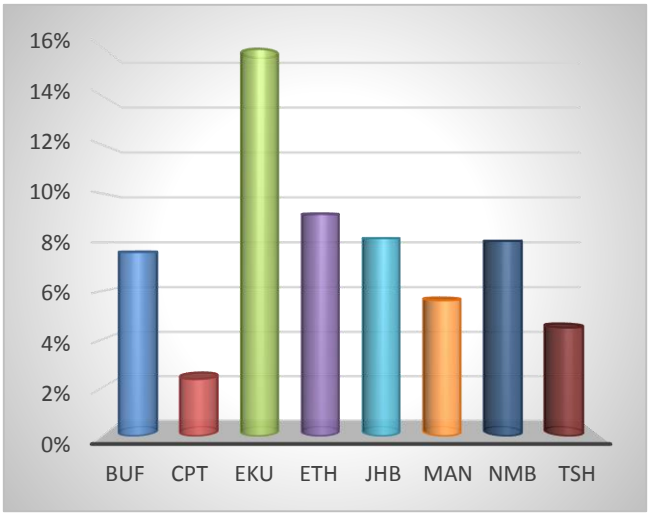
Authorised consumption, in the IWA water balance, includes metered/ unmetered and billed/unbilled consumption and provides an indication of the actual water used by the consumer.

Per capita authorised consumption is the highest in City of Johannesburg followed by Mangaung and City of Tshwane. Per capita authorised consumption is the lowest in Buffalo City, eThekwini and Nelson Mandela Bay. The average is 195 litres / capita / day.

A high authorised unit consumption could be an indication of inefficient water use, often as a result of high internal plumbing leakage or paying consumers who do not value the scarcity of water. A low authorised unit consumption could be an indication of unmetered consumption included in the water losses component of the water balance or a large volume of unauthorised consumption or theft.

2.3.3 Commercial loss (% of SIV)

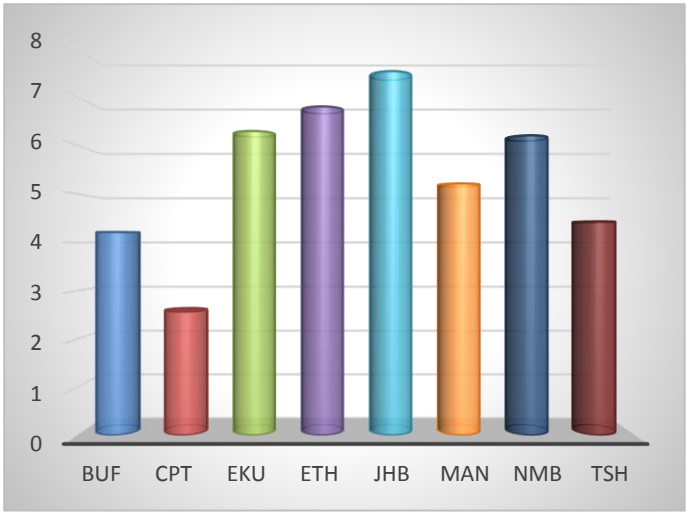
The commercial or apparent loss, as % of the SIV, is made up from the unauthorised consumption (theft or illegal use), plus all technical and administrative inaccuracies associated with customer metering.



The average commercial loss, as % of the SIV, is 7.7%. There is still huge uncertainty in most metros with regards to commercial loss, with none of the metros being able to provide quantifiable evidence on meter accuracy, illegal connections and data transfer errors. Metros are encouraged to investigate these parameters further and provide quantifiable evidence.

Commercial losses cannot improve if there is not a good relationship between the finance and technical departments in municipalities. City of Cape Town is a prime example, as the metro with the lowest commercial loss, where the consumer meters are managed and read by the same department. The finance and technical departments in all metros should interact on a daily basis to ensure consumer meters are properly installed, repaired, inspected, read and billed. All metros should strive to meter and bill, based on actual meter readings, to ensure the financial sustainability of the metro, customer satisfaction and reduction of NRW.

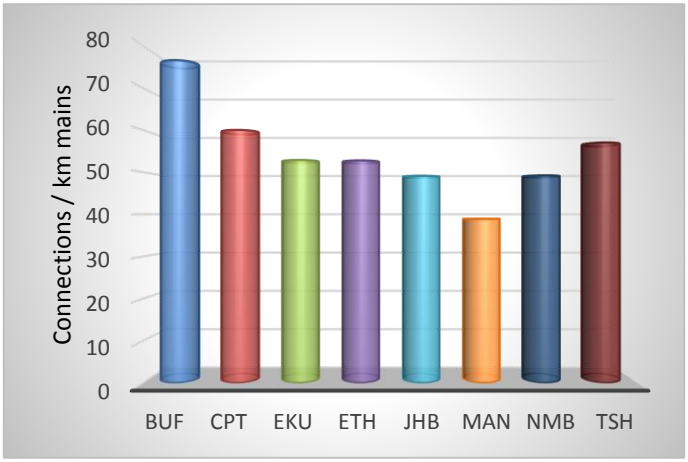
2.3.4 Physical water loss (ILI)



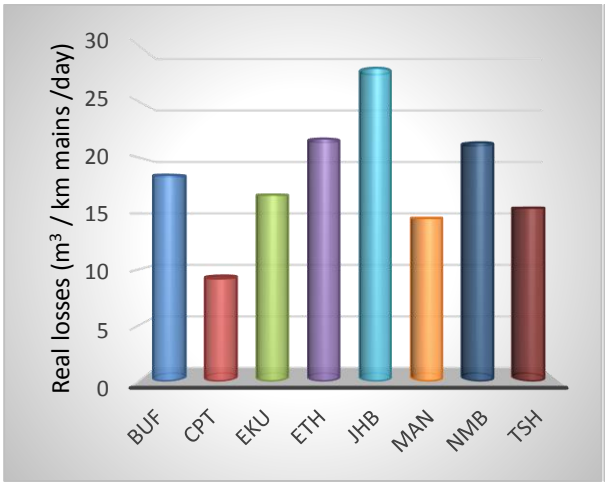
The Infrastructure Leakage Index (ILI) is the preferred real water loss indicator of the IWA and used in the scorecard to assess real losses. The ILI provides an indication of the current physical losses versus the expected physical losses. For example, an ILI of 3 means that the current leakage in the system is 3 times the expected minimum leakage.

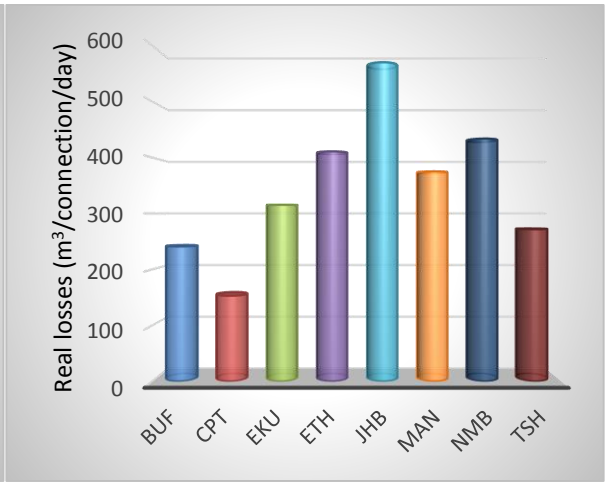
The average ILI for all metros is 5.4 while the weighted average is 5.5. City of Cape Town has the lowest ILI followed by Buffalo City and City of Tshwane. The ILI for Buffalo City seems unrealistically low considering their NRW is 39.5% and efficiency is 242 litres / capita / day.

The ILI calculation is influenced by the length of mains, number of connections and average system pressure. The density of connections per km mains varies from 77 connections per km in Buffalo City to 39 connections per km mains in Mangaung, with an average of 54 connections per km for all metros. The high density of connections in Buffalo City increases their unavoidable real losses (UARL) and reduces their ILI. The validity of the ILI as an indicator has been raised by some of the metros and this will be investigated further.



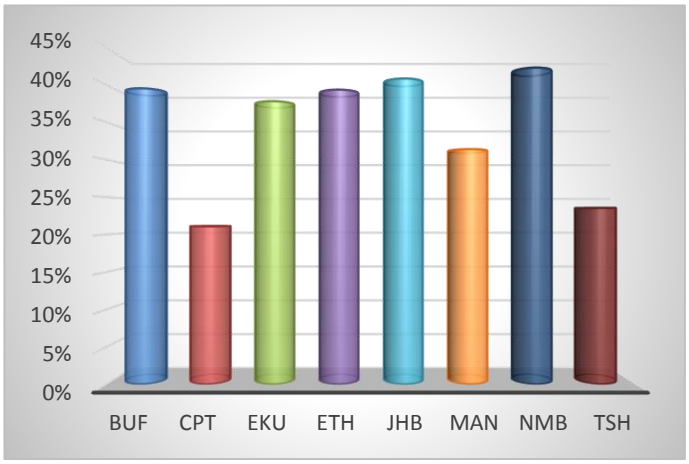
Other real water loss indicators include litres/connection/ day and m^3/km mains/day which shows a much higher real loss per km main for Buffalo City.





2.3.5 Percentage non-revenue water (%)

NRW is the volume of water supplied by the water utility but for which it receives no income. It should be noted that all billed water is considered revenue water, irrespective whether it is paid for or not.

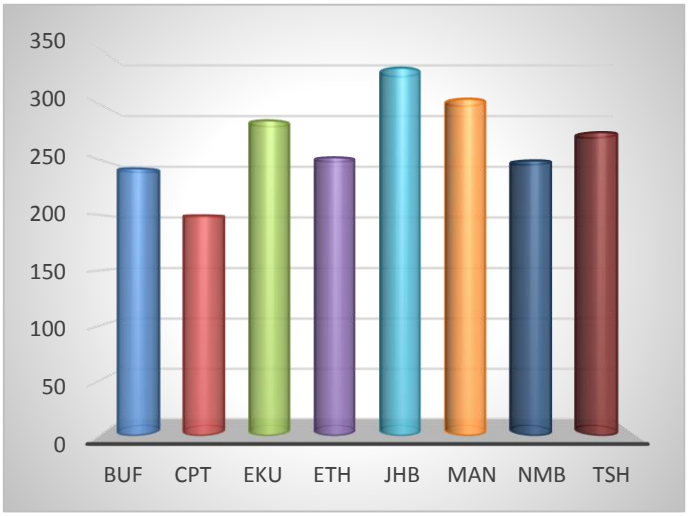


The total volume NRW is 923.5 million m^3/annum. Six metros (three quarters) have NRW in excess of 35%. The metro average NRW is 34.5% and the weighted average is 42.8%. At an average of R 6.00 / kl purchasing cost, this represents a loss of almost R 5.5 billion per annum (R6.00 x 923.5 million m^3/annum)

According to National Treasury (DWS workshops, 2013), water sales should generate approximately 10 to 30% of the municipality's income and should have the infrastructure and capacity to perform metering, billing and cost recovery.

2.3.6 Litres per capita per day

Litres per capita per day provides an indication of the gross volume of water used per capita (person) per day. Although the calculation is based on the total system input volume (m^3/year) which includes industrial consumption, it does provide a useful indicator.



The average litres / capita / day is 267 and the weighted average 274. The weighted average is highly influenced by City of Johannesburg which is not only the largest consumer but also has the highest per capita consumption. The average consumption is above the international benchmark of 180 ℓ/c/d (WRC, 2012) and metros are encouraged to target an average consumption of below 200 ℓ/c/d.

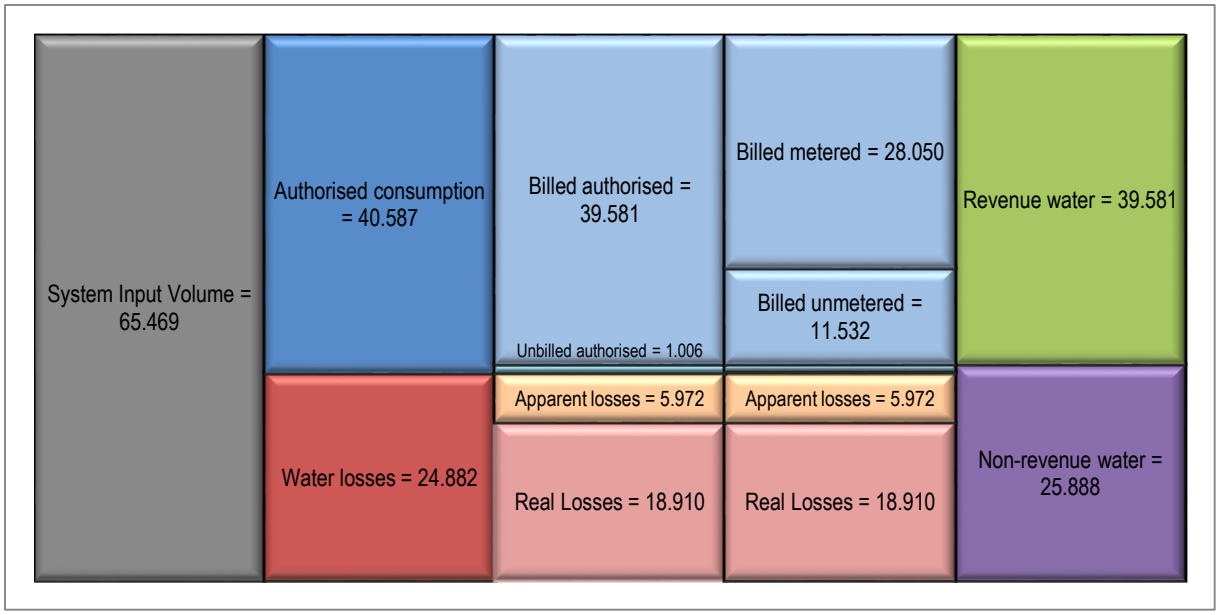
3 METROPOLITAN OVERVIEW

3.1 Buffalo City Metro

2014 Municipal No Drop Score	54.92%

Key Performance Area	Weight	All supply systems
WCDM Strategy, planning and implementation	20%	67.0%
Asset Management	15%	17.0%
Technical skills	5%	31.5%
Credibility	10%	48.0%
Compliance and Performance	35%	58.8%
Local Regulation	5%	70.0%
Customer care	10%	46.0%
Bonus Scores		3.93%
Penalties (included in KPI score)		0.03%
No Drop Score (2014)		**54.92%**
Water Use Targets (Recon and All-Town Strategy Targets		0.00 million
Availability of supply based on current WUL or SLA		71.21 million
System Input Volume (kl/annum)		65.47 million
Infrastructure Leakage Index (ILI)		**4.2**
Apparent / Commercial Losses (% of SIV)		**7.6%**
Non-revenue water (%)		**39.5%**
Water Use Efficiency (l/cap/day)		**242**
NDRR		**25**
$NDRR/NDRR_{max}$		**58.1**
Authorised consumption (l/cap/day)		150
Real Losses (litres/conn/day)		241
Real Losses (m^3/km mains/day)		18
% Water losses		38.0%

2013/14 IWA water balance (million m^3/annum)



Regulatory Impression

The metro is commended for their commitment towards the completion of the No Drop Audit which is expected to significantly contribute to improving water use efficiency and water loss within the organisation. The Department appreciates the metro's commitment towards the targets of the Amatole reconciliation strategy, but is also disappointed to note that the metro has failed to allocate sufficient funding and human resources to ensure that these targets are achieved. The Department is pleased to notice the implementation of a comprehensive management information system to enhance asset management and management information. Improved asset management is expected to improve management information in order to reduce physical losses. Non-revenue water has improved significantly in the past year but this improvement is largely because of increased billed unmetered consumption and not reduced water losses. Unmetered and unbilled connections do not promote efficiency and have a direct impact on the financial sustainability of the metro. The metro must concentrate the billing of their large consumers and unmetered connections to improve non-revenue water and commercial loss. Metering and billing should be combined with community awareness and war-on-leaks programmes to reduce losses and SIV.

The metro achieved a respectable overall score of 54.92% for their first complete No Drop Audit. Improved asset management, technical skills, credibility and customer care will significantly improve the overall score. Penalties were raised for lack of a SLA and WUL, excluding WDM targets from the CFO's performance contract and a perceived large number of billing corrections.

The risk index shows that the metro resides in medium risk space, with a NDRR of 58.1%.

No Drop findings

- Review the WDM strategy and business plan to ensure the targets are aligned with the Amatole reconciliation strategy;
- Proposed WDM projects must be funded and implemented to ensure WDM targets are achieved;
- Reduce the large number of unmetered connections;
- Implement a continuous and comprehensive mains replacement programme to avoid backlogs;
- Implement a bulk meter and PRV operations and maintenance programme to improve water losses and decision support systems;
- Convene WDM progress meetings and provide training and capacity building to emphasise, accelerate and co-ordinate WDM within the organisation; and
- Implement community and schools awareness programmes throughout the metro.

Sustainability pathway

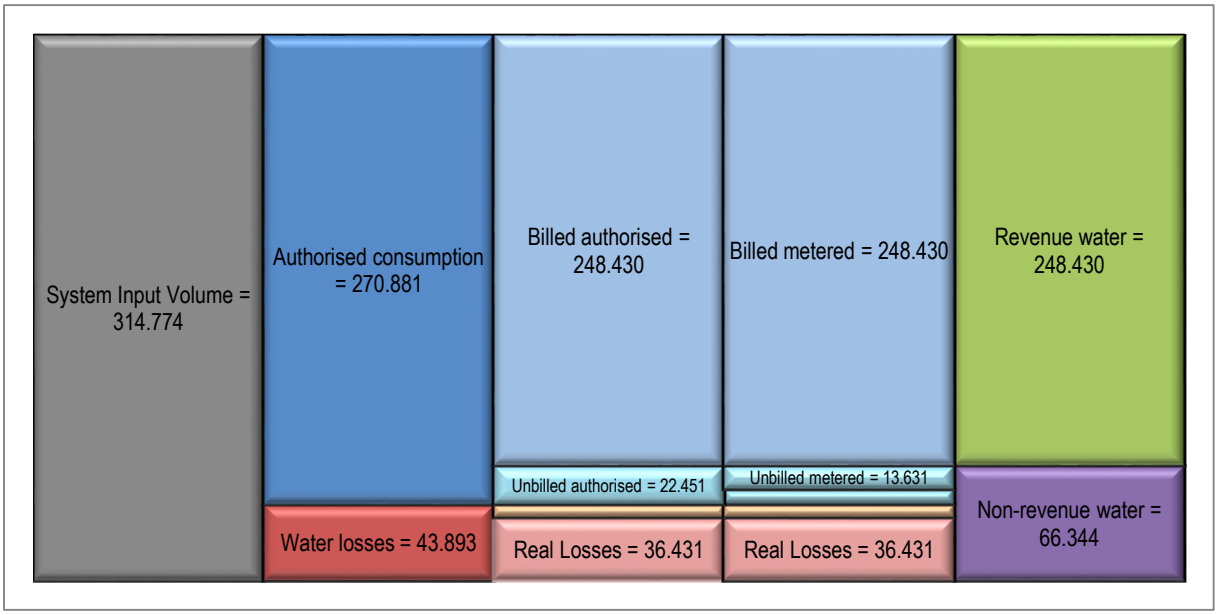
The metro should endeavour to implement the recommendations of the No Drop assessment, which will lead to improved sustainability, and security of water services.

3.2 City of Cape Town Metro

2014 Municipal No Drop Score	83.54%

Key Performance Area	Weight	All supply systems
WCDM Strategy, planning and implementation	20%	100.0%
Asset Management	15%	67.0%
Technical skills	5%	92.5%
Credibility	10%	84.0%
Compliance and Performance	35%	66.0%
Local Regulation	5%	100.0%
Customer care	10%	74.0%
Bonus Scores		4.97%
Penalties (included in KPI score)		0.00%
No Drop Score (2014)		**83.54%**
Water Use Targets (Recon and All-Town Strategy Targets		385.90 million
Availability of supply based on current WUL or SLA		398.70 million
System Input Volume (kl/annum)		314.77 million
Infrastructure Leakage Index (ILI)		2.6
Apparent / Commercial Losses (% of SIV)		**2.4%**
Non-revenue water (%)		**21.1%**
Water Use Efficiency (l/cap/day)		200
NDRR		**26**
NDRR/$NDRR_{max}$		**54.2**
Authorised consumption (l/cap/day)		192
Real Losses (litres/conn/day)		153
Real Losses (m^3/km mains/day)		9
% Water losses		13.9%

2013/14 IWA water balance (million m^3/annum)



Regulatory Impression

The metro is congratulated for having successfully completed their first full No Drop Audit. The metro's attendance, commitment, preparation and timeous submission of information are reflected in the overall score. The metro's general reporting, engagement between officials and politicians, awareness campaigns, organisational structure and capacity is commendable. Improved analysis of bulk meter and PRV data should improve overall score and performance. Commercial losses and unmetered connections should be better quantified to avoid water balance fluctuations.

The metro achieved a highly commendable 83.54% overall score for their first full No drop Audit. The metro has performed excellently in the WDM strategy and planning, technical skills, local regulation and community awareness categories. Cathodic protection and advanced pressure management are the only bonus criteria which did not attract a score. A small penalty was raised for billing inaccuracies.

The risk index shows that the City resides in medium risk space, with a NDRR of 54.2%.

No Drop findings

- Increase mains replacement programme to avoid possible backlogs;
- Improve bulk meter management and PRV operation and maintenance. Improved operations and maintenance will enhance the monitoring and evaluation of management information and decision support systems;
- Repair and commission cathodic protection on steel pipelines;
- Provide WDM training and capacity building within the organisation;
- 90% of leaks must be repair within 24 hours to attract full score; and
- Review minimum pressure design criteria and implement aggressive pressure management.

Sustainability pathway

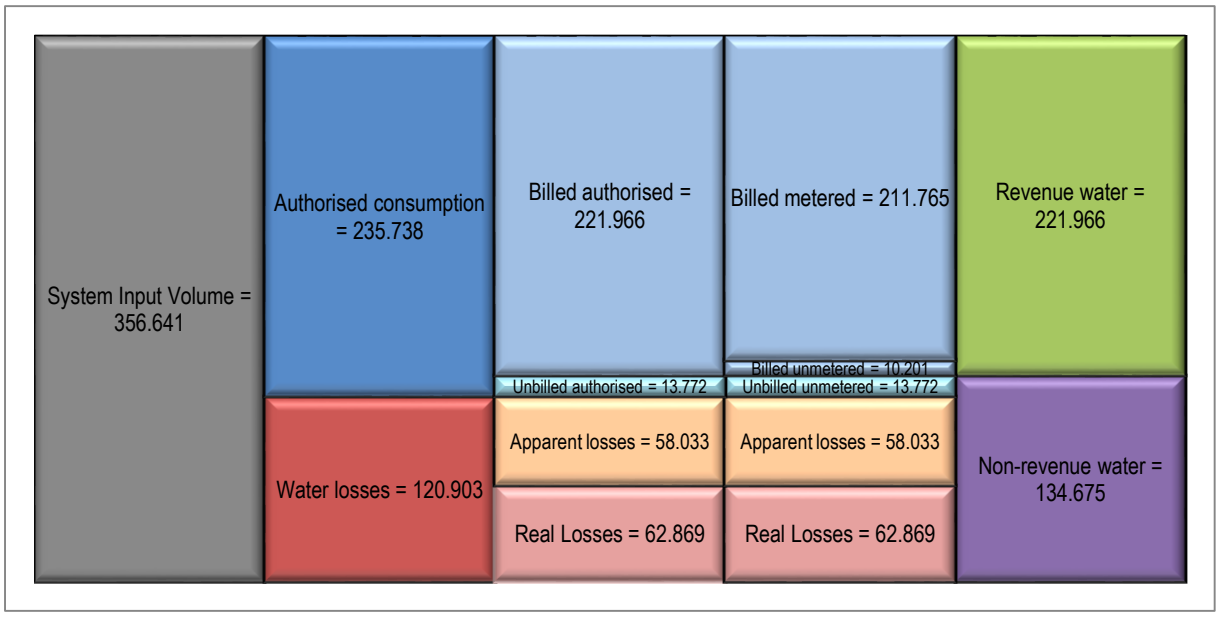
The metro should endeavour to implement the recommendations of the No Drop assessment, which will lead to improved sustainability, and security of water services.

3.3 Ekurhuleni Metro

2014 Municipal No Drop Score	76.03%

Key Performance Area	Weight	All Supply Systems
WCDM Strategy, planning and implementation	20%	81.5%
Asset Management	15%	76.8%
Technical skills	5%	91.0%
Credibility	10%	94.0%
Compliance and Performance	35%	45.0%
Local Regulation	5%	100.0%
Customer care	10%	86.0%
Bonus Scores		4.92%
Penalties (included in KPI score)		0.00%
No Drop Score (2014)		**76.03%**
Water Use Targets (Recon and All-Town Strategy Targets		343.00 million
Availability of supply based on current WUL or SLA		288.79 million
System Input Volume (kl/annum)		356.64 million
Infrastructure Leakage Index (ILI)		**6.3**
Apparent / Commercial Losses (% of SIV)		**15.92%**
Non-revenue water (%)		**37.82%**
Water Use Efficiency (l/cap/day)		**285.2**
NDRR		**37**
NDRR/$NDRR_{max}$		**77.1%**
Authorised consumption (l/cap/day)		191
Real Losses (litres/conn/day)		316
Real Losses (m^3/km mains/day)		17
% Water losses		33.2%

2013/14 IWA water balance (million m^3/annum)



Regulatory comment:

Ekurhuleni Metro performed exceptionally well in this first full No Drop assessment. It is understandable that the performance levels of metros are not yet at that of the Blue and Green Drops, as municipalities still have to come to terms with the requirements of the Regulator and also the detailed levels of scrutiny that they are exposed to as part of the No Drop audit. It is against this background that Ekurhuleni is congratulated for a notable performance. The Metro does face a number of significant challenges, the most urgent of which is the clear alignment of its water demand management strategy with the Vaal Reconciliation Study targets. The aggressive Water Demand Management plan which is currently in place, is commended. However, the Metro will have to follow through with sufficient budget allocation to make the targets set achievable. The Metro performed very well in terms of its overall strategy, its level of proven technical skill, the high level of data credibility, excellent local regulation as well as high levels of customer care. The overall findings indicated that the Metro could improve somewhat on asset management which ranked as average and that the Metro could improve substantially in terms of its general compliance levels. Of particular concern are high levels of physical water loss, high levels of non-revenue water and high levels of per capita water use. A slightly negative trend in these indicators, on a year-to-year comparative basis, should also provide additional support to a focussed and driven implementation of the Metro's Water Demand Management Plan.

The achievement of 76.03% in this assessment is considered a very good performance. This finding is supported by the fact that the Metro was not allocated any significant penalties in this assessment round. The inspectors noted that the Metro's team were motivated and well prepared for the assessment. The Regulator wishes to commend Ekurhuleni and its team for its energetic contribution to the outcome of this assessment.

The risk index shows that the City resides in high risk space, with a NDRR of 77.1 %.

No Drop Findings:

- The Metro must ensure that its Water Demand Management Targets are clearly linked with the Vaal Reconciliation Study targets and the urgencies highlighted by any discrepancies must be mirrored in terms of budget allocation;
- The recent increased activity in the Metro's pipe replacement programme is noted. This effort must be sustained and increased further to have the desired effect;
- Increased maintenance effort and monitoring associated with the Metro's control valves and bulk meters will improve overall performance;
- Cathodic protection of large diameter steel mains needs to be addressed urgently in the Metro;
- The Metro reports a high commercial loss allocation. This must addressed urgently to ensure increased income generation;
- Most performance indicators show a slight negative trend which must be arrested and reversed through urgent implementation of the Water Demand Management Plan; and
- The high number of stands experiencing pressures exceeding 90m must receive attention.

Sustainability pathway

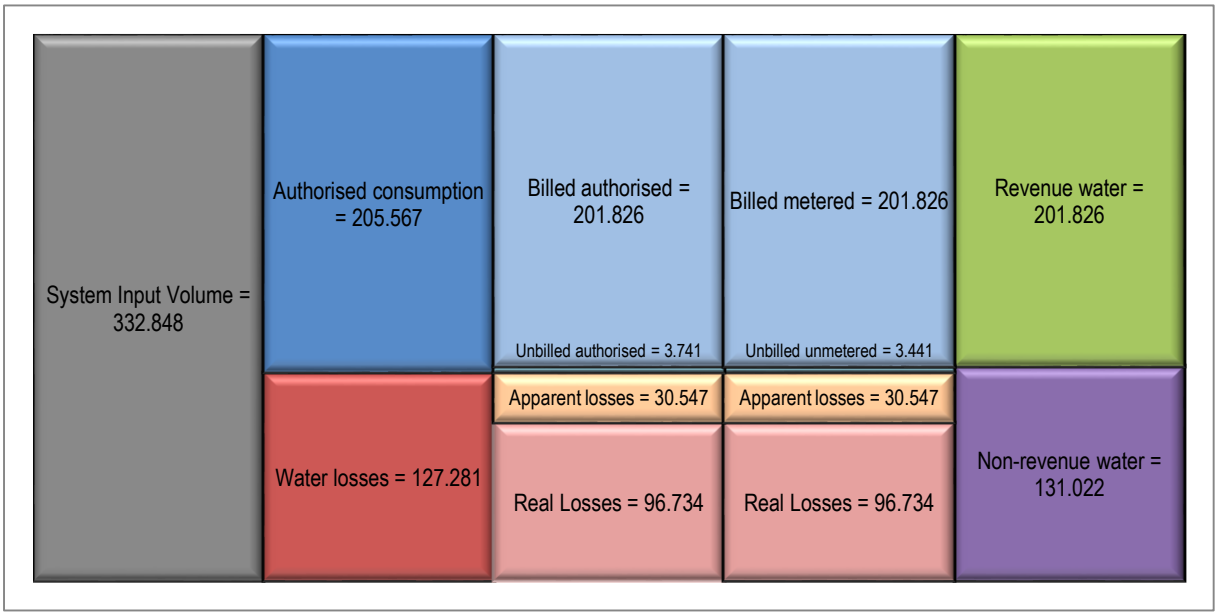
The metro should endeavour to implement the recommendations of the No Drop assessment, which will lead to improved sustainability, and security of water services.

3.4 eThekwini Metro

2014 Municipal No Drop Score	75.04%

Key Performance Area	Weight	eThekwini Metro & Umgeni Water
WCDM Strategy, planning and implementation	20%	89.5%
Asset Management	15%	57.8%
Technical skills	5%	36.0%
Credibility	10%	98.0%
Compliance and Performance	35%	53.8%
Local Regulation	5%	97.0%
Customer care	10%	76.0%
Bonus Scores		5.62%
Penalties (included in KPI score)		0.02%
No Drop Score (2014)		**75.04%**
Water Use Targets (Recon and All-Town Strategy Targets)		Not available
Availability of supply based on current WUL or SLA		350.00 million
System Input Volume (kl/annum)		332.85 million
Infrastructure Leakage Index (ILI)		**6.8**
Apparent / Commercial Losses (% of SIV)		**9.2%**
Non-revenue water (%)		**39.4%**
Water Use Efficiency (l/cap/day)		**252**
NDRR		**36.5**
$NDRR/NDRR_{max}$		**76%**
Authorised consumption (l/cap/day)		156
Real Losses (litres/conn/day)		411
Real Losses (m^3/km mains/day)		22
% Water losses		38.2%

2013/14 IWA water balance (million m^3/annum)



Regulatory impression

The utility was well presented at the audit with representatives from technical and finance. The utility was well prepared and presented the information in a concise and structured manner.

The Department of Water and Sanitation is concerned that utility has not yet adopted the results from the KZN recon study and their water balance information does not yet adequately reflect the large number of unmetered and unbilled connections in the rural areas. A detailed master plan and GIS management information system will assist the utility with planning and documentation.

The Metro's attention is also drawn to the high number of penalties which have been raised against it. This is mostly due to the non-submission of evidence. The Metro will note that this detracts quite substantially from its performance but this can fortunately be addressed fairly easily. In addition to this, the Metro did not score well with respect to its overall response to the compliance and performance criteria with non-revenue water, fairly high per capita usage and a lack of pressure related data being the most significant issues. The latter should be easy to resolve. More disconcerting is the overall negative trend from previous assessment periods in all performance indicators. To an extent, this may be related to the ongoing process of refining the input parameters to the water balance, which appears to be problematic in most metros. eThekwini does, however, seem to have additional challenges in this regard.

The utility is fortunate to have a dedicated and focussed team working along with its other sections to address the WCWDM ambitions. Given that support for the team is evident from the management structures of the Metro, the DWS remains optimistic that the Metro will be able to improve its overall performance in the short term.

The risk index shows that the City resides in high risk space, with a NDRR of 76%.

No Drop Findings:

- The WDM Plans leave some room for improvement in terms of incorporating raw water balances and reconciliation targets in the form of kl/a for the period of assessment
- Increase mains replacement programme to 1% of total length per annum to avoid possible backlogs
- Improve consumer and bulk meter management and PRV operation and maintenance.
- Improved operations and maintenance of bulk meters and control valves will enhance the monitoring and evaluation of management information and decision support systems
- Repair and commission cathodic protection on steel pipelines
- Provide WDM training and capacity building
- The City should aim to repair 90% of leaks within 24 hours to attract a full score
- Review minimum pressure design criteria and implement aggressive pressure management
- The bonus for political support was not taken up by the metro, and/or evidence was not dated within the assessment period
- The 2014 Commercial Losses, NRW and WUE show a digression when compare against the 2013 results
- None of the performance indicators attracted the best available scores – addressing these in future will have a marked improvement on the overall No Drop score

- No evidence for war on leaks initiatives were presented, resulting in a partial score
- Customer care records of queries need to be prioritised.

Sustainability pathway

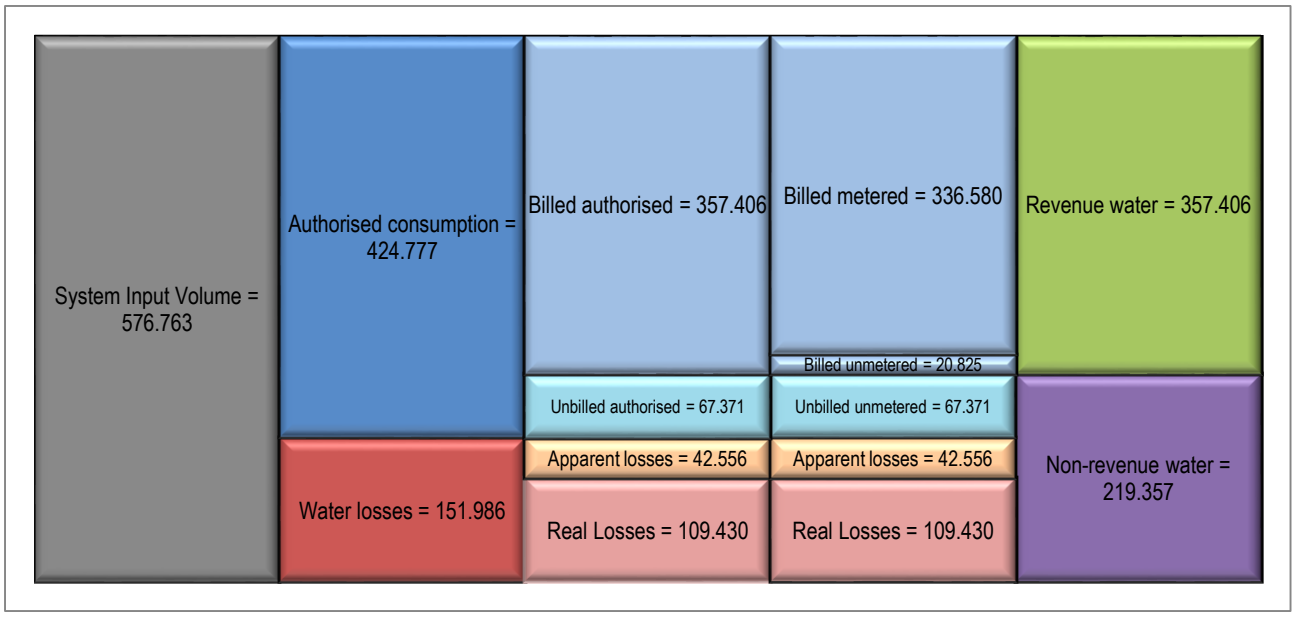
The metro should endeavour to implement the recommendations of the No Drop assessment, which will lead to improved sustainability, and security of water services.

3.5 City of Johannesburg Metro

2014 Municipal No Drop Score	67.33%

Key Performance Area	Weight	All supply systems
WCDM Strategy, planning and implementation	20%	86.5%
Asset Management	15%	57.8%
Technical skills	5%	91.0%
Credibility	10%	90.0%
Compliance and Performance	35%	29.0%
Local Regulation	5%	93.5%
Customer care	10%	73.0%
Bonus Scores		5.70%
Penalties (included in KPI score)		0.00%
No Drop Score (2014)		**67.33%**
Water Use Targets (Recon and All-Town Strategy Targets		450.05 million
Availability of supply based on current WUL or SLA		467.15 million
System Input Volume (kl/annum)		576.76 million
Infrastructure Leakage Index (ILI)		**7.5**
Apparent / Commercial Losses (% of SIV)		**8.2%**
Non-revenue water (%)		**40.9%**
Water Use Efficiency (l/cap/day)		**333**
NDRR		**37.7**
NDRR/$NDRR_{max}$		**78.1%**
Authorised consumption (l/cap/day)		236
Real Losses (litres/conn/day)		570
Real Losses (m^3/km mains/day)		28
% Water losses		29.2%

2013/14 IWA water balance (million m^3/annum)



Regulatory impression:

The main reasons for not crossing the 80% No Drop barrier are explained in terms of high NRW, commercial losses and pressure management. This score can be viewed under the criteria dealing with 'Compliance and Performance". In the improvement in water use efficiency over the past 2 years is however, noted with encouragement.

The achievement of a 67.3% No Drop score on the first round of a comprehensive assessment is no small feat and the Metro is lauded for its fine effort, prepared team, and timely submission of evidence. No penalties have been applied and a number of bonuses could be collected as result of the diligence by the City.

The risk index shows that the City resides in a high risk space, with a NDRR of 78.1%.

No Drop Findings:

- Investigate the number of meters versus the number of accounts rendered;
- Flow meter verification and replacement practices on all bulk and zone meters;
- Turnaround time on completion of work orders and turnaround time;
- Improve the delivery (km/year) against the pipe replacement project;
- Cathodic protection on steel pipes may be accelerated;
- The 2014 ILI, commercial losses, and NRW show a digression when compare against the 2013 results;
- A high number of stands experience static pressures of >90 meter and need to be prioritised;
- Enforcement of consumer connections compliance need to be addressed as provided for in the Bylaws;
- The fast tracking of revenue enhancement measures and incentives will hold a high value proposition and should be prioritised; and
- The innovative ideas on reuse of effluent, rainwater and groundwater use may be accelerated to set a benchmark in the water sector.

Sustainability pathway

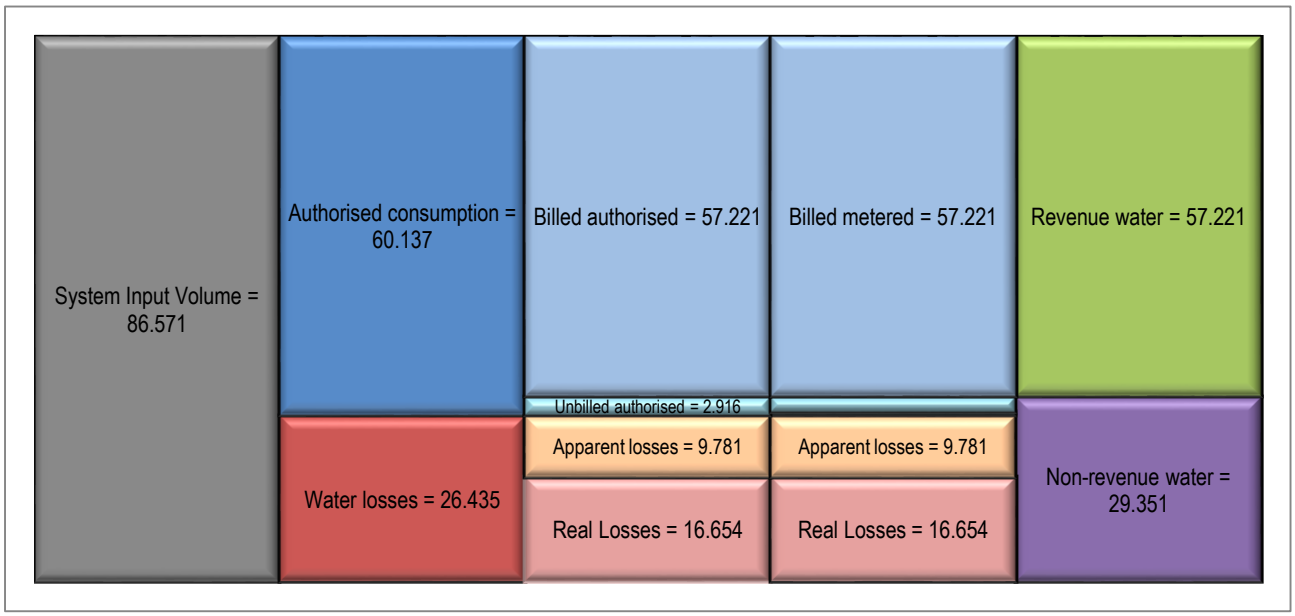
The metro should endeavour to implement the recommendations of the No Drop assessment, which will lead to improved sustainability, and security of water services.

3.6 Mangaung Metro

2014 Municipal No Drop Score	56.70%

Key Performance Area	Weight	Bloemfontein	Botshabelo	Thaba Nchu	Mangaung all systems
WCDM Strategy, planning and implementation	20%	59.5%	52.5%	52.5%	58.0%
Asset Management	15%	51.0%	51.0%	66.0%	52.3%
Technical skills	5%	29.5%	12.0%	12.0%	25.8%
Credibility	10%	56.0%	56.0%	56.0%	56.0%
Compliance and Performance	35%	51.3%	40.0%	36.0%	48.5%
Local Regulation	5%	78.5%	77.3%	77.3%	78.2%
Customer care	10%	36.0%	36.0%	36.0%	36.0%
Bonus Scores		5.82%	6.08%	6.08%	5.88%
Penalties (included in KPI score)		0.03%	0.03%	0.03%	0.03%
No Drop Score (2014)		**57.91%**	**51.89%**	**52.74%**	**56.70%**
Water Use Targets (Recon and All-Town Strategy Targets		86.78 million	86.78 million	86.78 million	86.78 million
Availability of supply based on current WUL or SLA		82.68 million	82.68 million	82.68 million	82.68 million
System Input Volume (kl/annum)		68.22 million	10.97 million	7.38 million	86.57 million
Infrastructure Leakage Index (ILI)		**4.6**	**5.7**	**9.4**	**5.2**
Apparent / Commercial Losses (% of SIV)		**3.1%**	**5.7%**	**8.6%**	**5.6%**
Non-revenue water (%)		**26.4%**	**42.0%**	**62.0%**	**31.4%**
Water Use Efficiency (l/cap/day)		**377**	**141**	**290**	**305**
NDRR		**31.5**	**19.5**	**16.5**	**22.5**
NDRR/NDRR$_{max}$		**73.3**	**69.9**	**71.7**	**71.6**
Authorised consumption (l/cap/day)		292	84	112	219
Real Losses (litres/conn/day)		411	254	834	375
Real Losses (m^3/km mains/day)		14	16	24	15
% Water losses		22.5%	40.8%	61.5%	28.1%

2013/14 IWA water balance (million m^3/annum)



Regulatory comment:

The inspectors reported that Mangaung's water loss team were enthusiastic and included representatives from the Water Demand Management section, other technical sections as well as Finance. The team initially had limited evidence to present but this was corrected to an extent in the days that followed the assessment. There were a number of queries raised regarding the water balance figures which form the basis of any target set or performance management exercise. With these challenges stated, the Regulator wishes to commend Mangaung and its team with the good spirit and appreciation with which it approached this exercise and the value it sought in this consultative process. Although Bloem Water only attended the second day of the assessment, its contribution is also acknowledged. The absence of senior management from the assessment was noted by the inspectors and this might be a gap which Mangaung can address in future assessments.

The Regulator needs to highlight that Mangaung's presentation was unique in that it presented its water balance information for three individual systems, which highlighted that Metro's need to consider its supply systems in terms of its differing characteristics. This separation may have been made simpler by the geographic separation of systems but it definitely highlighted that systems perform differently for a large number of reasons and need to be considered and managed accordingly.

The Metro's overall performance of 56.70% indicates there is substantial room for improvement. The Metro could not demonstrate sufficient technical skill in this round of assessments with levels of strategy, asset management data credibility, overall compliance performance and customer care that can only be described as average to poor in cases. Levels of local regulation are better but this cannot yet be described as good.

The risk index shows that the City resides in high risk space, with a NDRR of 71.6%.

No Drop Findings:

- There is a need for Mangaung to improve water balance data to improve consistency and improve trend assessment. Ongoing flow meter verification is one of the requirements for this. The inspectors indicated some concern with respect to the data presented. It is therefore difficult for the Regulator to express opinion on the performance of the Metro. The per capita usage in the Bloemfontein system of 377 ℓ/cap/day is notable for being very high. The improvement from the previous year's 462 ℓ/cap/day can also not be commended with confidence due to the concern over the accuracy of the data presented. The generation of more accurate water balances must be one of the metro's more urgent targets;
- Mangaung, with the assistance of Bloem Water, needs to adopt the Greater Bloemfontein Reconciliation study targets in order to measure performance and ensure long term sustainability of its water resources;
- Although a 5 year Water Demand Management Plan is in place this is yet to find traction. Sufficient budget allocation and allocation of responsibility for the various performance targets are non-negotiable prerequisites;
- The draft water tariff policy with stepped water tariffs must be implemented in order to encourage water conservation;

- Improved evidence preparation and submission during future assessment rounds will improve score. Existing pipe replacement efforts as well as existing operations and maintenance budgets could not be acknowledged in this round due to a lack of credible evidence;
- Asset management must be improved. Increased control valve and meter maintenance efforts associated with improved data collection and analysis will improve performance and consequently No Drop scoring;
- Many of the water demand management posts in the recently approved organogram were not yet filled at the time of the assessment. The situation in the Botshabelo and Thaba Nchu is more severe than that of Bloemfontein which is already very problematic. This must be prioritised by the Metro;
- There is a clear need for closer cooperation between departments and to gain greater political support within the Metro. This can be achieved through better communication and reporting and also regular performance management and liaison meetings between the various departments involved with water demand management. Performance targets need to be set for departments, individuals within the various departments and senior officials that follow from the Water Demand Management Strategy; and
- The Metro must develop and implement a customer charter.

Sustainability pathway

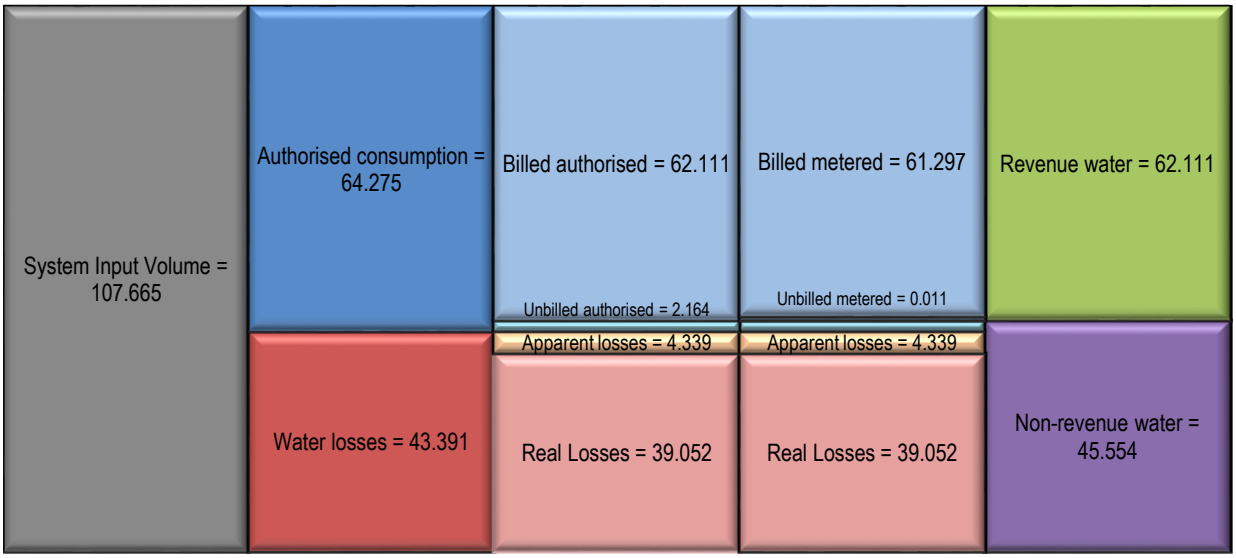
The metro should endeavour to implement the recommendations of the No Drop assessment, which will lead to improved sustainability, and security of water services.

3.7 Nelson Mandela Bay Metro

2014 Municipal No Drop Score	67.61%

Key Performance Area	Weight	All supply systems
WCDM Strategy, planning and implementation	20%	81.0%
Asset Management	15%	58.8%
Technical skills	5%	46.5%
Credibility	10%	96.0%
Compliance and Performance	35%	44.8%
Local Regulation	5%	94.0%
Customer care	10%	32.0%
Bonus Scores		7.11%
Penalties (included in KPI score)		0.02%
No Drop Score (2014)		**67.61%**
Water Use Targets (Recon and All-Town Strategy Targets		168.00 million
Availability of supply based on current WUL or SLA		131.87 million
System Input Volume (kl/annum)		107.67 million
Infrastructure Leakage Index (ILI)		**6.2**
Apparent / Commercial Losses (% of SIV)		**8.1%**
Non-revenue water (%)		**42.3%**
Water Use Efficiency (l/cap/day)		**249**
NDRR		**24.5**
NDRR/$NDRR_{max}$		**87.5**
Authorised consumption (l/cap/day)		149
Real Losses (litres/conn/day)		434
Real Losses (m^3/km mains/day)		21
% Water losses		40.3%

2013/14 IWA water balance (million m^3/annum)



Regulatory impression

The metro is commended for having successfully completed their first full No Drop Audit, despite significant staff capacity and budget constraints. The metro has managed to accelerate their WCWDM programme in recent years, urged by the drought situation, and implemented projects of note. The Department is, however, disappointed to note that much of these gains were lost in the past year. The Department is concerned about the metro's billing system which reflects on the metro's water balance data inconsistencies and high non-revenue water. High non-revenue water impacts directly on the financial sustainability of the metro, ability to fill vacancies and fund additional WCWDM programmes. The metro is lauded for having worked with the Department to develop and adopt the results from the Algoa reconciliation strategy, but must ensure these targets are achieved to ensure water security and mitigate possible water restrictions. The metro must engage much closer with their community to ensure the value of water and implications of further water restrictions are clearly understood.

The metro achieved a commendable overall score of 67.61% for their first full No Drop Audit. High scores were achieved for WDM strategy and planning, credibility and local regulation. The metro was heavily penalised for their high water losses, non-revenue and efficiency scores, as reflected by the compliance and performance score. Penalties were raised for not presenting a WUL and exclusion of performance targets in senior official performance contracts.

The risk index shows that the City resides in high risk space, with a NDRR of 87.5%.

No Drop findings

- Confirm the number of unmetered connections as the existing figure seems unrealistically low;
- Review the WDM strategy and business plan to ensure targets are aligned with the requirements of the Algoa reconciliation strategy;
- Ensure the WDM business plan projects are funded and implemented;
- Expand the mains replacement programme to avoid backlogs;
- Implement a bulk meter and PRV operations and maintenance programme;
- Provide WDM training and capacity building;
- Ensure 90% of leaks are repairs within 24 hours;
- Develop and disseminate a municipal customer charter; and
- Improve community awareness through informative billing, schools awareness and community awareness programmes.

Sustainability pathway

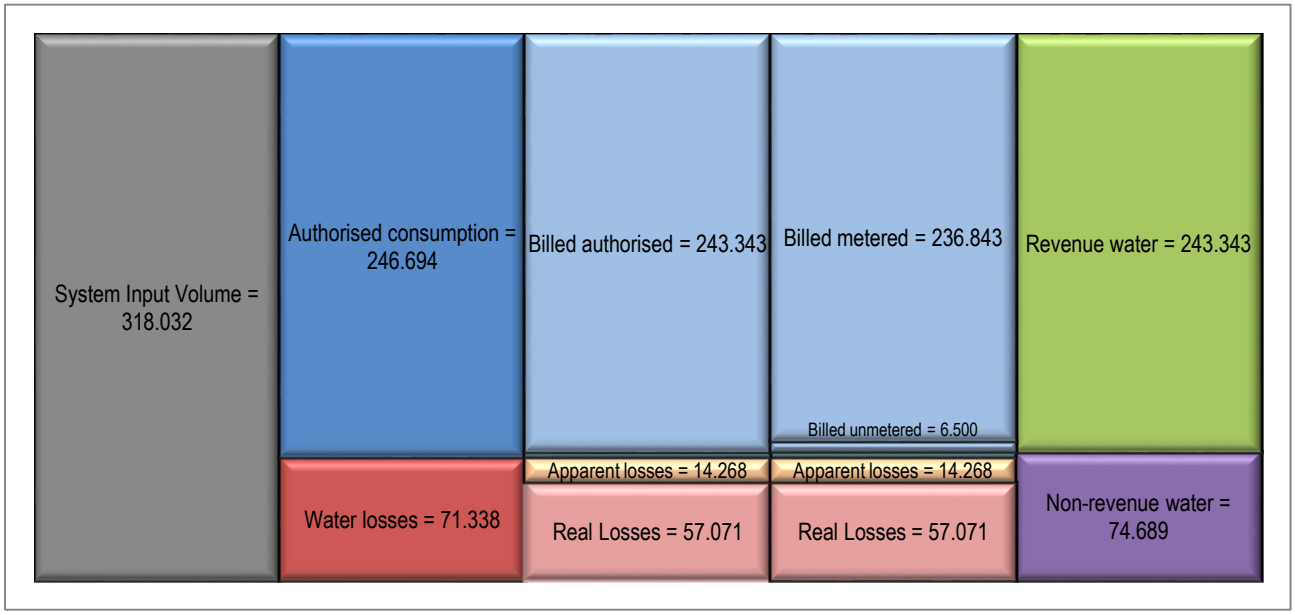
The metro should endeavour to implement the recommendations of the No Drop assessment, which will lead to improved sustainability, and security of water services.

3.8 City of Tshwane Metro

2014 Municipal No Drop Score	70.47%

Key Performance Area	Weight	City of Tshwane
WCDM Strategy, planning and implementation	20%	75.8%
Asset Management	15%	88.3%
Technical skills	5%	48.0%
Credibility	10%	46.0%
Compliance and Performance	35%	54.3%
Local Regulation	5%	97.5%
Customer care	10%	77.0%
Bonus Scores		3.52%
Penalties (included in KPI score)		0.07%
No Drop Score (2014)		**70.47%**
Water Use Targets (Recon and All-Town Strategy Targets		Not available
Availability of supply based on current WUL or SLA		Not available
System Input Volume (kl/annum)		318.05 million
Infrastructure Leakage Index (ILI)		**4.4**
Apparent / Commercial Losses (% of SIV)		**4.5%**
Non-revenue water (%)		**23.6%**
Water Use Efficiency (l/cap/day)		**275**
NDRR		**27.5**
NDRR/$NDRR_{max}$		**57.3**
Authorised consumption (l/cap/day)		213
Real Losses (litres/conn/day)		272
Real Losses (m^3/km mains/day)		16
% Water losses		22.5%

2013/14 IWA water balance (million m^3/annum)



Regulatory impressions

The Department of Water Affairs wishes to acknowledge the CoT for the competence and energy with which it cooperated during this round of the No Drop. The utility was well presented by the Technical Department, which has proven itself to be a formidable WDM team. The DWS however also noted that the CoT was not equally represented by other municipal departments and must indicate that this has led to a reduced performance score. More importantly, the DWS's overall assessment of the CoT is that it still approaches WDM and WUE as a purely technical problem, while case studies have shown that the required targets can only be achieved if the utility approaches this crises as a broadly based service delivery challenge. The CoT's representation was well prepared and the information available was well presented. It is apparent that the utility has a clear understanding of their water loss situation and performs well, as reflected by their KPIs, despite the lack of human resources and budgets. It is expected that the current performance levels can, however, not be sustained and set targets will not be achieved if vacancies are not filled and budgets are increased to levels reflected in the various business plans presented during the audit. It is also critical that the utility adopt and implement the results from the Vaal recon study to ensure that the links between available resource and consumption levels are foremost in the setting of targets and timelines to achieve those targets.

The performance of CoT is buoyed by the excellent scores achieved in data credibility and local regulation, but is weighed down by average to poor performances in other areas. The DWS rate the Water Demand Management Plan (WDMP) of the CoT as good, but note that it is not funded nor staffed adequately - in fact the funding and staffing levels can be described as very poor. On this basis the WDMP will not find traction and the targets will not be achieved. This is similarly reflected in the following:

- Maintenance of infrastructure is not handled on a proactive basis. This includes pressure management systems and flow metering;
- The mains replacement programme is slow as it is funded to the tune of R15m for the current financial year while the business plans indicate an allocation of R80m is required in the next 5 years;
- Responses to customer queries do not meet the required sub-48 hour performance target; and
- System pressures exceed best practice limits.

The DWS however remains optimistic that the CoT can perform well against the various performance measures and against the WDM and WCP targets set as it has a solid technical core in terms of knowledge and experience as showcased in the past. Solid political support and the direct involvement of the broader municipality will ensure success.

The risk index shows that the City resides in medium risk space, with a NDRR of 57.3%.

No Drop findings

- A good WDM Plan is in place, but is not supported with adequate staff or funds to ensure implementation thereof
- Maintenance of infrastructure is not handled on a proactive basis.
- Pressure management and flow metering need to be prioritised
- System pressures exceed the best practice limits

- Responses to customer queries do not meet the required sub-48 hour performance target
- No household leak programmes are being implemented
- A partial penalty is raised where WUL are not in place (Rietvlei, Fountains and boreholes), or the target limits exceeded (ie Rand Water, Bronkhorstspruit)
- Cathodic protection on steel pipes may be accelerated;
- Evidence to demonstrate political support and participation in WDM may receive attention in future
- Flow meter verification and replacement practices on meters leaves room for improvement
- The 2014 NRW show a digression when compare against the 2013 results
- ILI, NRW and water use efficiency did not attract the best available scores
- Two of 2 scenario showed that a high number of stands experience static pressures of >90 meter and need to be prioritised;
- The bonuses for target achievement, war on leaks initiatives and pressure management were not taken up by the City
- Enforcement of consumer connections compliance need to be addressed as provided for in the Bylaws;
- The fast tracking of revenue enhancement measures and incentives will hold a high value proposition and should be prioritised; and
- Engagement initiatives with stakeholders will result in uptake of this particular bonus, in particular government and NGO institutes.

Sustainability pathway

The metro should endeavour to implement the recommendations of the No Drop assessment, which will lead to improved sustainability, and security of water services.

4 OVERVIEW OF INTERVENTION PROGRAMMES

The top five priority projects for each metro are summarised in the following table.

Intervention	BUF	CPT	EKU	ETH	JHB	MAN	NMB	TSH
Pressure management		X		X	X	X	X	X
Pipeline, valve and meter replacement	X	X	X	X	X	X		X
Top consumer audits		X	X	X				X
Bulk metering, sectorisation and monitoring	X						X	X
Household leak repair programme		X	X		X	X		
Removal of mid-blocks			X		X			
Metering of unmetered properties	X		X	X		X		
Leak detection and repair		X		X	X	X		
Community awareness	X				X		X	
Water reuse	X	X						

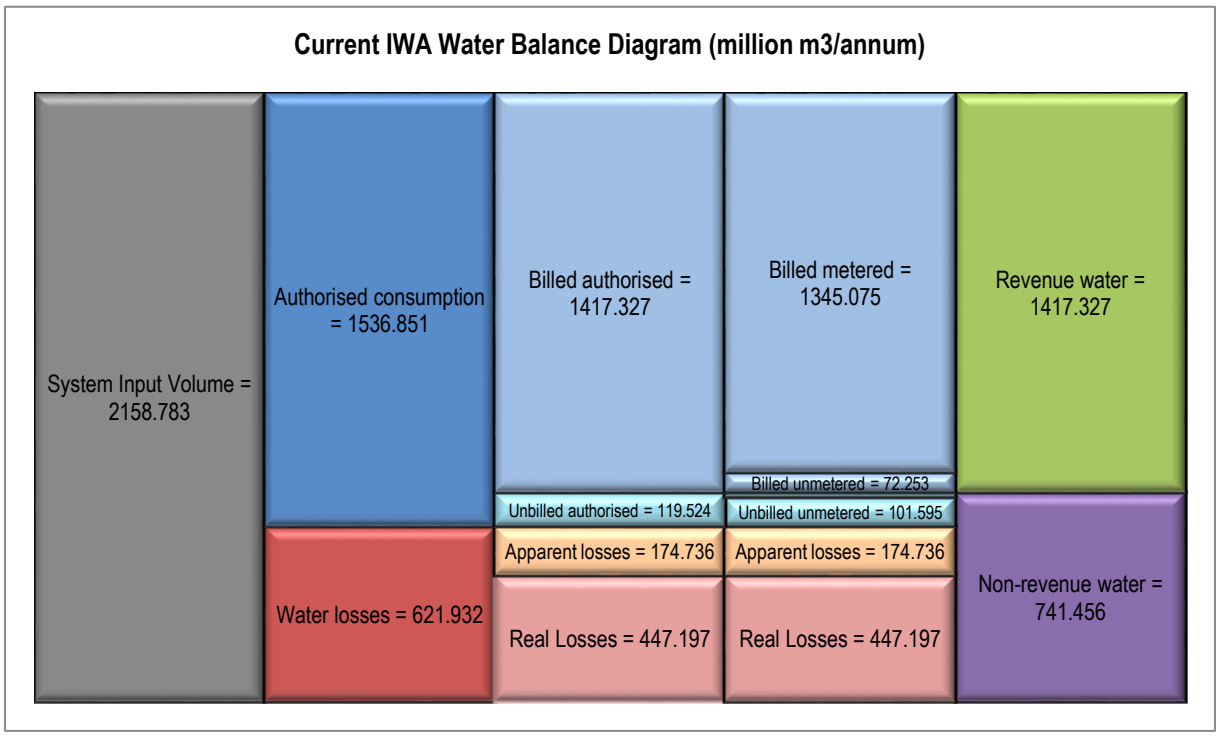
The WCWDM programmes in most metros will focus on asset renewal, followed by pressure management. It should be noted that some of the intervention would be implemented by default, although not specifically mentioned. It will, for instance, not be possible to implement pressure management without proper bulk metering, sectorisation and monitoring.

Pressure management, top consumer audits, household leak repair programmes, metering and billing of unmetered properties and water reuse have been proven to provide a very good return on investment, with payback periods of less than 3 years. Pipeline, valve and meter replacement programmes require huge capital expenditure, but are required to ensure the sustainability of the water infrastructure. Community awareness programmes are expensive to implement and the impact is often difficult to measure, but should form an integral part of any successful WCWDM programme. It is interesting to note that only three metros will be focussing on community awareness in the next few years. Leak detection and repair should be performed on an ongoing basis to reduce physical leakage and improve public image. The water utility cannot promote water conservation in their communities while they have water running down the streets.

The WCWDM budgets and targets are summarised in the following table. The results indicate that there is a great variance across metros due to what is considered WCWDM budget. For example, some metros consider consumer meter replacements as part of their maintenance budget and mains replacement as part of their capital budget and exclude these from their WCWDM budget.

Metro	2014/15 budget required (million)	2014/15 budget approved (million)	Budget shortfall	Targets
BUF	R 28.0	R 5.00	R 23.0	SIV reduction = 11 739 kl/d by 2017
CPT	R 359.2	R 270.5	R 88.7	Water losses < 15% by 2015/16 NRW < 20% Demand growth < 2 %
EKU	R 370.0	R 150.0	R 220.0	NRW = 20% by 2019
ETH	R 84.5	R 79.0	R 5.5	NRW < 25% by 2018/19 SIV = 919 559 kl/d by 2016/17
JHB	R 771.4	R 771.4	R 0.0	SIV reduction = 92.0 million kl/a by 2018
MAN	R 225.3	R 135.9	R 89.4	Reduced SIV = 4618 kl/day by 2017 5489 kl/day by 2022
NMA	R 25.2	R 15.0	R 10.2	Bulk: Reduce to 5% losses by 2016 Reduce losses by 59Mℓ/d by 2016 Reduce NRW by 1% pa
TSH	R 100.4	R 5.0	R 95.4	Reduce SIV by 18.59 million kl/a by 2017
Total	**R 1 964.0**	**R 1 431.8**	**R 532.2**	

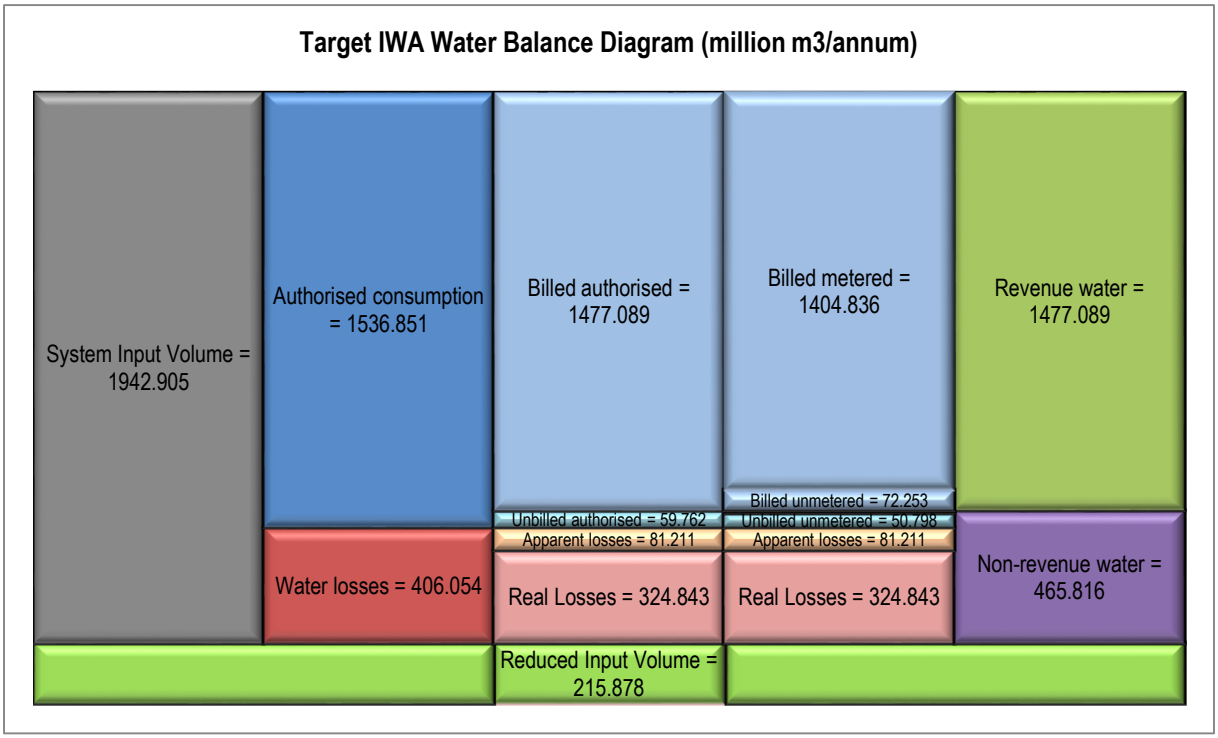
To illustrate the potential benefit from WCWDM the current IWA water balance for all the metros is shown below.



Most metros need to reduce their SIV by approximately 10% to ensure sustainability of supply and meeting the targets of the respective recon studies. Unbilled consumption currently account for 16%

of the NRW and should be converted into billed consumption to generate income for the metro and promote water use efficiency. It is accepted that it will be difficult to eliminate unbilled consumption but a 50% reduction should be achievable. It was also mentioned before that the average system pressure is high and a 10% reduction in average system pressures should be possible.

Based on these assumptions, it was possible to develop a target IWA water balance as shown below.



The current and target KPIs are summarised below

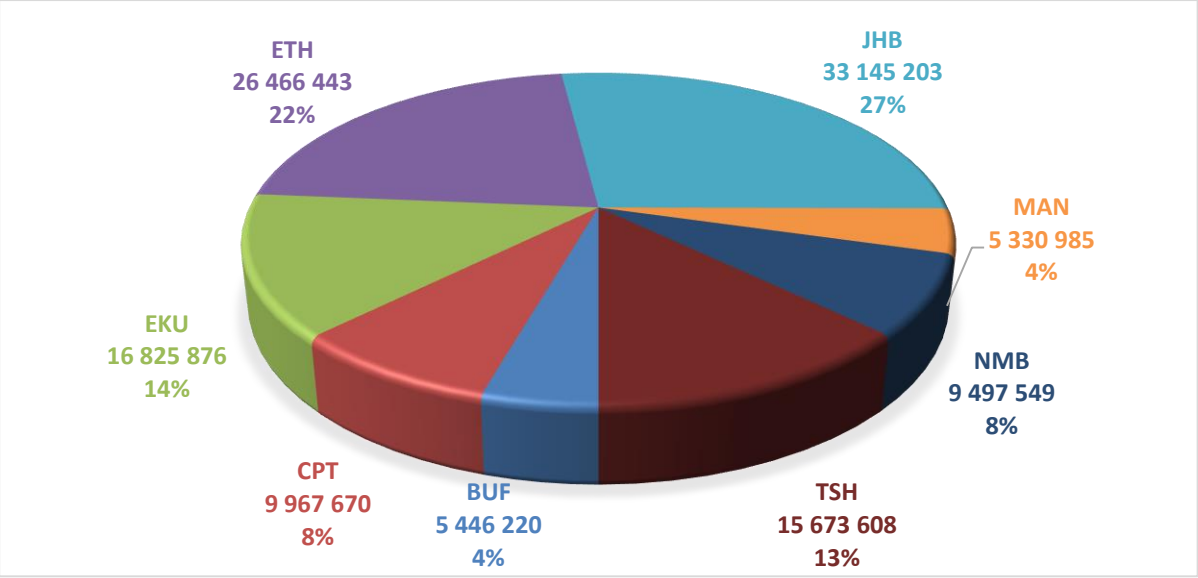
KPI	Current	Target
Availability of supply based on current WUL or SLA	2 108.4 million	2 108.4 million
System Input Volume (kl/annum)	2 158.8 million	1 942.9 million
Infrastructure Leakage Index (ILI)	5.5	4.4
Apparent / Commercial Losses (% of SIV)	7.7%	4.2%
Non-revenue water (%)	34.5%	24.0%
Water Use Efficiency (l/cap/day)	274	247
Authorised consumption (l/cap/day)	195	195
% Water losses	28.8%	20.9%

A 10% reduction or 216 million m^3/a in SIV can save metros approximately R 1.3 billion per annum at R 6.00/kℓ through reduced water purchases. Increasing the billed consumption by 60 million m^3/a through halving the unbilled consumption can generate approximately R 717 million per annum at R 12.00/kℓ. Achieving these targets, will generate approximately R 2 billion additional income for the metros through reduced water purchases and increased water sales. This is equivalent to the current funding required and can be used to obtain funding from financial institutions.

City of Johannesburg and eThekwini contribute 49% to the total reduction in physical leakage as shown in the following table.

Metro	Current			Target				Rand value @ R 6.00/kl		
	UARL (kl/annum)	CARL (kl/annum)	ILI	UARL (kl/annum)	TARL (kl/annum)	ILI	Savings (kl/annum)	UARL R million	CARL R million	Savings R million
BUF	4 723 710	19 905 687	4.2	4 257 299	14 459 467	3.4	5 446 220	R 28.34	R 119.43	R 32.68
CPT	14 143 872	36 431 380	2.6	12 747 330	26 463 710	2.1	9 967 670	R 84.86	R 218.59	R 59.81
EKU	9 778 645	61 497 811	6.3	8 813 118	44 671 936	5.1	16 825 876	R 58.67	R 368.99	R 100.96
ETH	14 238 732	96 733 647	6.8	12 832 824	70 267 204	5.5	26 466 443	R 85.43	R 580.40	R 158.80
JHB	16 109 008	121 144 212	7.5	14 518 432	87 999 009	6.1	33 145 203	R 96.65	R 726.87	R 198.87
MAN	3 738 492	19 484 506	5.2	3 369 360	14 153 522	4.2	5 330 985	R 22.43	R 116.91	R 31.99
NMB	5 598 253	34 713 109	6.2	5 045 491	25 215 560	5.0	9 497 549	R 33.59	R 208.28	R 56.99
TSH	12 923 225	57 286 323	4.4	11 647 207	41 612 716	3.6	15 673 608	R 77.54	R 343.72	R 94.04
Total	**81 253 939**	**447 196 676**	**5.5**	**73 231 061**	**324 843 123**	**4.4**	**122 353 553**	**R 487.52**	**R 2 683.18**	**R 734.12**

The acceptable minimum level of leakage or UARL for the metros is 81.2 million m^3/annum which is valued at R 487.52 million/annum based on R 6.00/kl. The current level of physical leakage or CARL, however, is 447.2 million m^3/annum or 5.5 times higher than the acceptable minimum level of leakage. The current level of physical leakage is valued at R 2 683.18 million/annum based on R 6.00/kl. If the CARL could be reduced to an ILI 4.4, in line with the previous scenario, a saving of 122.35 million m^3/annum or R 734.12 billion/annum could be realised through reduced physical leakage. The R 6.00/kl is considered a realistic bulk water supply tariff for 2013/14, based on the Water Services Tariffs Report for 2012/13 (DWA, 2013).



5 CONCLUSIONS AND RECOMMENDATIONS

All metros have strategies and business plans to address the NRW, water losses and efficiency. Significant progress has been made with the implementation of these strategies and business plans, but there is still a lack of political support and participation, budgets, alignment to the Department's reconciliation strategies and understanding of the possible consequences of water restriction. The targets set under the various reconciliation strategies are included in the NDP and NWRS2 and it is critical that these targets are achieved to avoid possible water restriction and the subsequent detrimental economic impact. All metros must revise their strategies and business plans to ensure targets are achieved and the risk of water restrictions is minimised.

Asset management has a direct impact on WCWDM. Without proper operation and maintenance it will not be possible to monitor the water losses in a distribution system and perform basic functions such as metering, billing and cost recovery. Asset management should be performed on a proactive basis and the data obtained from bulk meters and control valve performance should be used to assess the leakage in the system. All metros could improve the operations and maintenance of their assets, which have a direct impact on water loss control.

No water services authority would be able to implement WCWDM without the necessary staff capacity and skills. Most WCWDM activities and preventative maintenance could be performed as part of the daily operation and maintenance of the system. Staff capacity and skills obtained the second lowest score of all the criteria and should be addressed as a matter of priority. A standard must be developed to specify the skills and capacity required to operate and maintain a water distribution system.

The information used to prepare a monthly water balance is in general credible, plausible and readily available. Proper management, reading and billing of consumer meters cannot happen if there is not a good relationship between the finance and technical departments. City of Cape Town is a prime example, as the metro with the lowest NRW, where the consumer meters are managed and read by the same department. The finance and technical departments in all metros should interact on a daily basis to ensure consumer meters are properly installed, repaired, inspected, read and billed. All metros should strive to meter and bill, based on actual meter readings, to ensure the financial sustainability of the metro and customer satisfaction.

Key performance indicators and compliance with the water demand management regulations contributed most to the overall score. Metros should endeavour to fix all leaks within 48 hours of becoming aware thereof, improve water losses, NRW and efficiency and implement pressure management. Improved compliance and performance will significantly improve the overall score of all metros. The large number of unmetered connections and deemed consumers must be addressed as a matter of priority to promote water use efficiency and generate income for the metros. The results indicate that average system pressures are high and there is scope for aggressive pressure reduction in all metros. Pressure reduction is a cost effective WCWDM measure and should be implemented as a priority.

All metros have the necessary policies and bylaws but enforcement could be improved through political support and additional human resources. Metros will get the benefit through reduced water theft, consumer awareness and equality.

There is significant scope for increased community awareness in all metros. Consumers need to be made aware that South Africa is a water scarce country and the value of water should be appreciated.

Community awareness programmes will improve the relationship between the metro and its customers, create more informed consumers and reduce the risk of service delivery unrest.

South Africa is a leader in water loss benchmarking and has adopted the concepts and methodologies of the IWA Water Loss Task Group. These concepts and methodologies have been included in the development of the No Drop scorecard but further research is required to interpret and understand the impact of certain parameters on some of the KPIs. Metros are also encouraged to further investigate and quantify their commercial losses which is a function of their consumer meter accuracy, illegal connections and data transfer errors. The audited water balance results provide the Department with a better understanding of how metros prepare their IWA water balance. This will enable the Department to develop guidelines to standardise the water balance calculation.

Metros could benefit from WCWDM programmes through improved service delivery, sustainable resources, financial viability, social and economic improvement. The key WCWDM interventions identified by the metros include pressure management, top consumer audits, household leak repair programmes, metering of unmetered properties and water reuse have been proven to provide a very good return on investment, with payback periods of less than 3 years. Pipeline, valve and meter replacement programmes also require capital expenditure, but are required to ensure the sustainability of the water infrastructure. Community awareness programmes do require budget to implement and the impact is often difficult to measure, but should form an integral part of any successful WCWDM programme.

Metros need approximately R 2 billion per annum to fund their WCWDM programmes and currently have a shortfall of R 500 million. A 10% reduction in SIV and reducing NRW to 25% can generate approximately R 2 billion additional income for metros through reduced water purchases and increased water sales. These additional funds should be reinvested by the metro towards WCWDM programmes to ensure sustainability and security of water services. There is a business case for obtaining funding from financial institutions, as the estimated savings are equivalent to the average annual budget required for WCWDM.